Behavioural and Post-Keynesian Foundations for a new Macroeconomics

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ABSTRACT

Orthodox macroeconomics, as it is taught in the majority of universities around the world, and practised in governments, central banks, and international agencies, limits the range of economic policy proposals which can be given serious consideration, and consequently biases policy outcomes.

This would not be a matter of concern, if the core axioms on which the dominant orthodox model is based were valid; if the empirical predictions of the model were reliable; or even if there were good reasons for limiting the range of policy proposals to be considered in line with the restrictions imposed by the orthodox model.

If none of these are true, then addressing the inadequacies of modern orthodox economics is a worthwhile task, and identifying a set of theories and models which better describe people as they are, the economic system as it is, and the range of available policy options and achievable outcomes which exist, is important.

The aim of this study is to treat orthodox economics, in its various forms, with respect. The intention is not to dismiss lightly the insights which have been hard won by theorists and empiricists down the years. While the contention is that academic economics, in particular, is in need of changes which can reasonably be described as revolutionary, rather than gradual

and evolutionary, successful revolutions do not generally sweep away all that has gone before. That is not what is required now.

What is required is to identify those ideas, models and theories which are useful; those which can be modified so that they become useful; and those which are so misleading as to be useless. Future generations of economists should embrace enthusiastically a diversity of methodological approaches and be open to ideas and evidence drawn from outside the economics profession, and most notably from psychologists, neuro-scientists, and from fellow social scientists.

Nevertheless, if the modern orthodox model is to be challenged, there is a need for at least a broad outline of an internally consistent and more empirically grounded model of 'the economic system as it actually exists' and the study of people as they are.

The thesis is that this is possible, that the essential elements of a much more useful macroeconomics already exist and in some cases have existed for a very long time, and that they are mainly to be drawn from a modern development out of Post Keynesian economics and from insights into decision making and well being developed by behavioural economists, and supported by neuroscience.

The conclusion will be that macroeconomic policy proposals should be informed by stock-flow consistent modern monetary theory; that a job guarantee, or employer of last resort scheme, is a proposal which is affordable and potentially able to stabilise an unstable economy; that the elimination of involuntary underemployment can raise the subjective well-

being of millions of people and promote social inclusion; and that the framing of this and other policy proposals is of vital importance, and should not be neglected by economists and the politicians they advise.

DECLARATION

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and to the best of my knowledge and belief, contains no material previously published or written by any person, except when due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the university library, being available for loan and photocopying.

Steven Hail, March, 2016.

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I would also like to thank, if it were possible, an unknown banker, who, in spite of his seniority at work, was a student on a course I was teaching, leading to the membership examinations of the Chartered Institute of Bankers, in London, at some point during the late 1990s. He approached me, at the end of an intensive course, and with reference to the orthodox description of monetary policy, said, 'You know it couldn't really work that way, don't you?'

My greatest debt is to my wife, Katherine, for her love and support.

Chapter One

Introduction

"Knowledge will come only if economics can be reoriented to the study of man as he is and the economic system as it actually exists".

(Coase 2012)

1.1 Orthodox macroeconomics – 'a steadfast refusal to face facts'

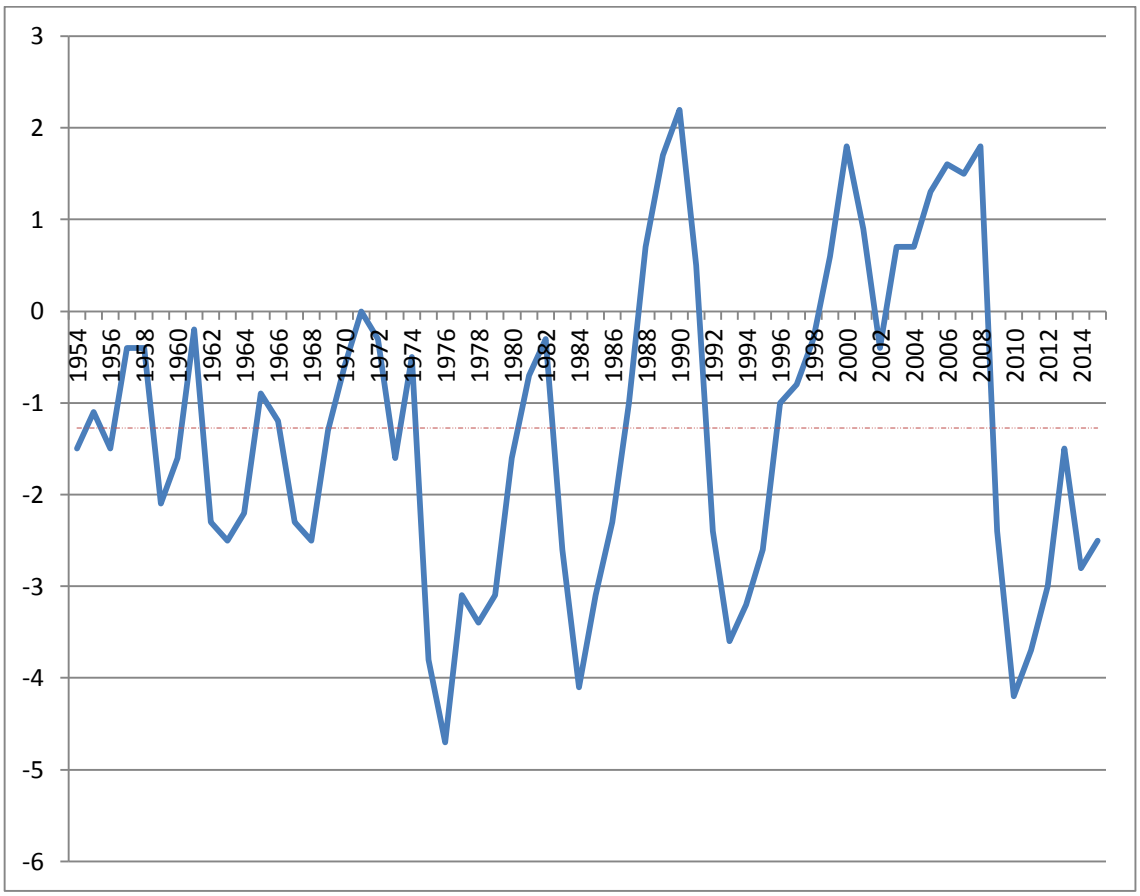
In November 2014, the Australian Parliamentary Budget Office reported that the Commonwealth Government needed to undertake actions 'to enhance productivity and maintain fiscal discipline', to return its fiscal balance to surplus and to give itself a margin of 'fiscal safety' to insure against 'unexpected economic shocks and other risks to the budget'. (Clarke 2014)

I will argue that this statement is mistaken, in the sense that a non-contingent commitment to any specific fiscal balance has no basis in realistic economic theory or historical evidence,

and that the term 'fiscal safety', taken out of context, is essentially meaningless for a monetary sovereign government.

In any event, the Australian Government has not normally run fiscal surpluses in the past, and as we shall see, there is very little reason to believe that will be the case in the future.

Figure 1.1: Australian Commonwealth Budget Balance (to 1996); General Government Fiscal Balance (from 1996); % of GDP



Data sources: http://www.rba.gov.au/statistics/frequency/occ-paper-8.html;
http://www.budget.gov.au/2015-16/content/bp1/download/Budget_Paper_No_1.pdf;
http://www.budget.gov.au/2014-15/content/fbo/downloads/FBO-2014-15-Consolidated.pdf

It is normal for government to run fiscal deficits most of the time, except in those countries with persistent and significant current account surpluses on their balance of payments. As we shall see, the deliberate pursuit of a fiscal surplus via austerity is under other circumstances dangerous and unlikely to be sustainable for very long.

That the Australian Parliamentary Budget Office may be giving misleading advice is a matter for concern.

In June 2010, in an interview with an Italian newspaper, Jean-Claude Trichet, the Chairman of the European Central Bank, claimed that 'the idea that austerity measures could trigger stagnation is incorrect' (Reuters 2010).

Subsequent evidence, many observers (including Mitchell 2015) agree, is at variance with his opinion. I will argue that he and his advisors ought to have known that this statement is false, as it no basis in realistic economic theory or historical evidence.

That the Chairman of the European Central Bank should make such statements, and that European government might have pursued ill-advised policies is of concern.

In the same year, Professor John Cochrane of the University of Chicago, agreed with Trichet, arguing that net government spending would have no significant impact on aggregate demand, with reference to Barro-Ricardian equivalence - the notion that such spending must be covered by borrowing, which must imply higher taxes in the future, and that the private sector would cut its spending now in anticipation of those future taxes. He went on to use some of Keynes' most famous words against him, claiming Keynes to be a 'defunct economist' (Cochrane 2010).

These statements are rooted in a misunderstanding of how monetary systems works, and of how real people make decisions. They have no basis in realistic economic theory or historical evidence. I will argue that this is and should have been obvious. I will argue that Keynes, though he died in 1946, is less 'defunct' than Cochrane.

There is widespread agreement that fiscal multipliers have been not only positive, but significantly higher than most economists expected them to be, in recent years (Blanchard & Leigh 2013). That prominent economists such as Cochrane might have been so fundamentally wrong on an issue of such importance is of concern.

At the beginning of 2010, in an interview with John Cassidy of the New Yorker, Eugene Fama is reported as having said he did not know what an asset price bubble means. 'People who get credit have to get it from somewhere. Does a credit bubble mean that people save too

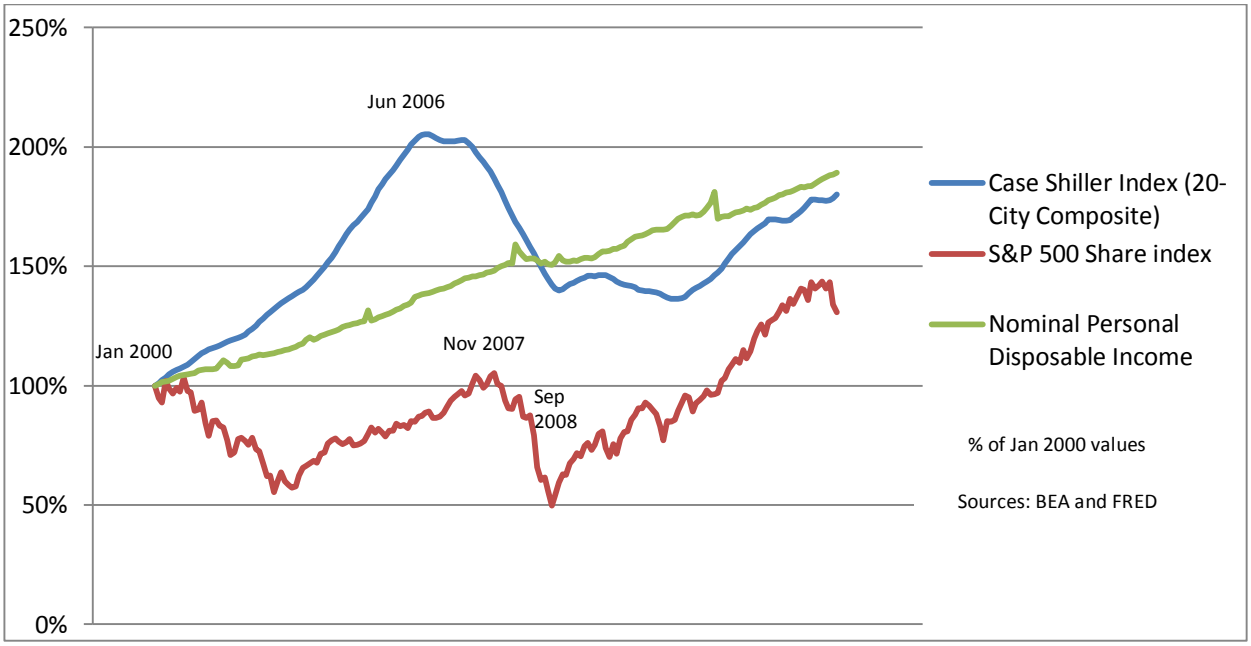
much during that period? I don't know what a credit bubble means. I don't even know what a bubble means. These words have become popular. I don't think they have any meaning' (Fama, quoted in Cassidy 2010). The Nobel laureate went on to claim that the US recession happened before the financial crisis, and that the latter was not a contributory factor to the former.

I will suggest that claims such as these are without justification, that they reflect a profound misunderstanding of the economics of the financial system, and that this should be clear to all economists at this point in history.

Equally perplexing is the joint award in 2013 of the *Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel* to Professor Fama and to Robert Shiller, despite Shiller profoundly disagreeing with Fama's views on almost everything of substance. Jeff Madrick (2014, pp 161-162) has rightly asked if any other discipline has ever seen the award of Nobels to two academics with such divergent views.

It will be obvious which of these two academics I contend to be the more worthy winner, particularly given the evidence that the US property bubble peaked as early as 2006, that the local stock market peak was in November 2007 and the collapse (unsurprisingly) in September 2008, and that the Great Recession in the US was mainly centred in 2009.

Figure 1.2: The Case-Shiller 20 City Composite Index; S&P 500 Share Index; and US Nominal Personal Disposable Income; % of Jan 2000 values; 2000-15



Data Sources: Bureau of Economic Analysis (BEA) and Federal Reserve Economic Data (FRED) web sites

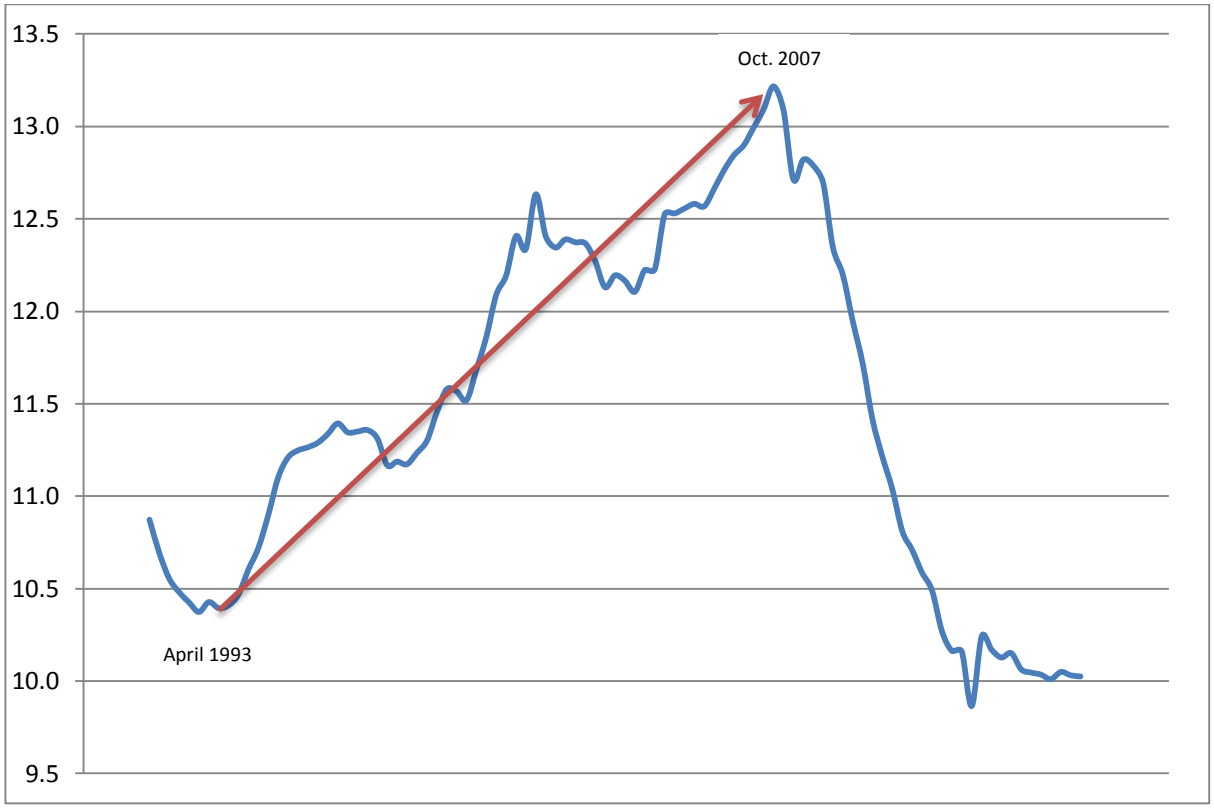
Other, very prominent economists who are often quoted in works questioning the relevance of what some call 'mainstream', but what I will call 'orthodox', macroeconomics are Olivier Blanchard, the chief economist at the International Monetary Fund; Robert Lucas, aNobel Prize winner, the father of the newclassical school, and the grandfather of the real business cycles school; and the recent chair of the Federal Reserve, Ben Bernanke. These three men have many differences of opinion, but essentially share the same underlying long run general equilibrium model of the economy.

Blanchard's now notorious quote is that 'the state of macro is good' (Blanchard 2009, p229).

Lucas's is 'the central problem of depression-prevention has been solved, for all practical purposes' (Lucas 2003, p1).

Bernanke's words are not so much a quote as a complacent and misleading term used in a speech to describe the period of growing financial fragility in the years leading up to September 2008 – the so-called 'Great Moderation' (Bernanke 2004). The arrow in the following chart illustrates what was happening to the debt service costs of US households, relative to their incomes after taxes and transfers, during this 'moderation'.

Figure 1.3: US Household Debt Service Costs as a Percentage of Personal Disposable Income; 1992-2015



Source: *Federal Reserve Economic Data, St. Louis FED*

There are so many other examples of unfortunate statements, or mixtures of confusion and obfuscation, coming from those at the peak of the modern, orthodox economics profession, that I could continue almost indefinitely with similar quotations.

Something is up with orthodox economics as it is currently taught and practiced. As Paul Krugman (2009) said in his New York Times blog, in response to Blanchard, 'The state of macro, in short, is not good'.

That is the beginning of my argument. The more important question is not however whether there is something wrong with orthodox macroeconomics, but rather what to do about this problem. There can be few if any more significant contemporary issues in any discipline.

These statements are not extreme. Indeed, they are sentiments shared to a greater or lesser degree by many who continue to operate principally within the neoclassical orthodoxy, as well as by bankers and fund managers, and of course by all heterodox, or non-neoclassical, economists. Willem Buiter (2009), Paul De Grauwe (2009, 2010) and Charles Goodhart (2009) are all at the top of the profession, and have all made and substantiated similar remarks.

Willem Buiter wrote in the Financial Times in 2009 of 'the unfortunate uselessness of most "state of the art" academic monetary economics'. He went so far as to argue that most Ph.D. level economic education over the previous thirty years had served to progressively weaken the discipline, rather than strengthen it.

Paul De Grauwe (2009), in the same publication a few months later, opined that 'the science of macroeconomics is in deep trouble'. I will refer to his *Behavioural Macroeconomics* (2010), which is a brilliant and valiant, if flawed, attempt to respond to this trouble, in my next chapter.

Charles Goodhart (2009) has accused orthodox economists of 'a steadfast refusal to face facts', while writing of 'the continuing muddles of monetary theory'.

There are few more eminent applied policy macroeconomists than Goodhart, De Grauwe and Buiter.

It is my aim in this study to treat orthodox economics, in its various forms, with great respect. I have no intention to dismiss lightly the insights which have been hard won by theorists and empiricists down the years. While I contend that academic economics, in particular, is in need of changes which can reasonably be described as revolutionary, rather than gradual and evolutionary, so that it can be 'reoriented to the study of man as he is and the economic system as it actually exists', successful revolutions do not generally sweep away all that has gone before. That is not what is required now.

What is required instead is to identify those ideas, models and theories which are useful; those which can be modified so that they become useful; and those which are so misleading as to be useless. In all, we, as a discipline, need to embrace enthusiastically a diversity of methodological approaches, to understanding the 'economic system as it actually exists'; and

we need to be open to ideas and evidence drawn from outside the economics profession, and most notably from psychologists, neuro-scientists, and from social scientists.

Nevertheless, if we are to challenge the modern orthodox model, we also need at least a broad outline of an internally consistent and more empirically grounded model of 'the economic system as it actually exists' and the study of people as they are.

My thesis is that this is possible; that the essential elements of a much more useful model already exist and in some cases have existed for a very long time; and that they are mainly to be drawn from a modern development out of Post Keynesian economics and from insights into decision making and well being developed by behavioural economists, and supported by neuroscience.

1.2 'The game of policy making is rigged'

> **"The game of policy making is rigged; the theory used determines the questions that are asked and the options that are presented. The prince is constrained by the theory of his intellectuals".**
>
> (Minsky 1986, p110)

The eminent financial journalist, Martin Wolf wrote, in *The Shifts and the Shocks* (2014), that 'radical reforms must be on the (economic policy) agenda'. Amongst the reforms he listed as worthy of consideration was the 'outright monetary financing' of government net spending.

Essentially the same reform is at the core of the modern monetary theory that I will examine in my study, and of the similar 'functional finance' approach to the government budget developed by Lerner in the 1940s (p 218-222).

The majority of modern money theorists also advocate a permanent and comprehensive employment guarantee scheme, as did Minsky (2013). The desirability of such a scheme and its feasibility will also be examined. Its role as an effective shock absorber in a complex monetary economy beset with Keynesian uncertainty and the potential for endogenously driven financial instability will be important.

The problem is that such questions as 'could an employment guarantee scheme contribute towards the public good?' and 'what is the appropriate role for the government budget balance to play in an economy of shifting and inter-connecting balance sheets?' cannot meaningfully be addressed using orthodox (general equilibrium) economic theory. Yet this theory remains dominant across the academy and amongst policy makers and their advisors.

Consequently, the game of policy making *is* rigged, and has become increasingly so over the past thirty years, partly for the reason suggested by Buiter. Politicians will not, and perhaps cannot, consider seriously policy proposals which are not consistent with orthodox models of how the economy works. These models are unfortunately 'useless' with respect to a wide set of important monetary and financial issues.

If, as I will maintain, it is true that orthodox models are fundamentally misleading in important respects, then it is the duty of heterodox economists to develop and offer alternative models and theories, which are not misleading, and which can be usefully employed to understand 'the economic system as it actually exists' and to consider the 'radical reforms' on Wolf's agenda.

We need to loosen some of the constraints on Minsky's 'prince', and perhaps tighten others. We need to make it respectable for politicians to discuss potentially worthwhile policy reforms, and we need to adopt a necessarily simplified but essentially realistic set of models within which to evaluate alternative policies.

In a sense, I will argue, we need the successful completion of a second, much clearer and more comprehensive, Keynesian revolution.

1.3 'Hard' theories – not 'soft' theories

> **"Hard-theories, because theories, describe logical operations that not only predict behaviour but also closely approximate the underlying physical and mental processes that give rise to those behaviours".**
>
> (Glimcher 2011, p393)

Glimcher is a leading neuroscientist, and inter-disciplinary researcher. In *Foundations of Neuroeconomics Analysis* (2011), he argues that a partial consilience between neuroscience, psychology and economics is both feasible and of value, and indeed is already happening. The anomalies which have long been identified by behavioural research with the axioms of revealed preference and expected utility theory, some of which are now so well attested as to justify their treatment as stylised facts, appear to have their ultimate causes in the neural processes of the human brain.

This is not yet widely appreciated by economists, and there is sometimes not only a lack of interest, but an ill-informed assertion that economists have nothing to learn from neuro-scientists, psychologists, or indeed any other disciplines.

Glimcher takes great care to be respectful to orthodox neoclassical economics, but nonetheless states, 'to be honest, the dominant response of the economics profession has been to ignore such findings' (p290).

He argues that economics needs to move away from the type of unrealistic-axiomatic reasoning advocated by Milton Friedman (1953), and towards an analysis of human behaviour which respects 'the physical limitations of the human brain' (p 142), and what is efficient in the sense of inclusive evolutionary fitness for those limitations to be (p 191).

More broadly, I will argue we need not only a realistic description of how individuals can process information to make and act upon decisions, but realism in terms of: (1) the information which actually exists and is available to decision makers; (2) the institutional and social framework within which they make those decisions; and (3) the macro-financial framework of inter-connecting and shifting balance sheets, within which financial fragilities can develop, and macroeconomic and prudential stabilisation can be discussed.

To use Glimcher's terminology, my thesis is that economics should now move from being a 'soft' ('as if') discipline to being a broadly 'hard' ('because') one.

Axioms, as in simplifying assumptions, are an essential economic modelling tool, and are justified where those axioms are themselves 'stylised facts'; where they can later be relaxed without significantly disturbing the predictions of a theory; or possibly where they serve to describe circumstances under which those predictions should be viewed as valid (Keen 2001, pp 148-155). Great care must be taken with this third justification, as the limiting circumstances for a theory to be valid have often been later ignored or misunderstood by those using such a theory to justify their opinions or actions.

> **"A person not previously instructed in economics might again ask, 'Whatever for?' What's the value of a coherent description of a fantasy world?"**
>
> (Galbraith 2014, p69)

Realistic-axiomatic reasoning, which is based usually on stylised facts and always explicitly on one of these justifications, is more likely to generate useful descriptions of economic processes, and more reliable contingent predictions of outcomes. The notion that unrealism doesn't matter, or that it may even be a good thing if it contributes towards more elegant models, is a serious flaw which remains at the centre of orthodox neoclassical ('soft') economics. It is possible to take issue with the way orthodox economists use the word 'elegant' in this context (Galbraith 2014, p67), but even if the mathematics of a model is viewed by some as elegant, if it is unrealistic and misleading, it is useless to the applied economist. This preference for beauty over truth, to again borrow from Krugman's blog, is perhaps the main reason why 'the science of macroeconomics is in deep trouble'.

If 'knowledge will come only if economics can be reoriented to the study of man as he is and the economic system as it actually exists', then knowledge will come only if we move from 'soft' to 'hard' economics.

If the world is messy, uncertain, disequilibrium system, tending towards instability, and not suitable for the development of analytical solutions using the mathematics of constrained optimisation, then that is the world we must deal with. If the human brain and human behaviour has evolved to deal with such an uncertain world, and not to make the calculations of expected utility of a radical individualist with extraordinary powers of foresight and cognition, then these are the humans we have to take into account.

The value of a 'coherent description of a fantasy world' is at least open to question. The soft economics of fantasy ought to be replaced by a hard economics with its roots in realism and explanation, and not in deduction from heroic 'as if' axioms. Economics should not have a 'soft' core.

And yet the core model which underlies modern orthodox economics, in both its (minority) Real Business Cycle and (majority) New Keynesian forms, is 'soft' and sometimes 'supersoft', in the sense that there is rarely if ever a concern for the realism of its underlying axioms, and often, as I have indicated, a defiance of realism.

This has not always been so. The roots of orthodox economics can be traced all the way back to Smith's *Wealth of Nations (1776)*, which for all its inaccuracies and later misrepresentations, was an attempt to describe the economy as it existed. It will remain an important part of the historical foundations of any new 'hard' economics.

Unrealistic abstraction crept into classical economics over time, notably in the model building of David Ricardo and his successors; and, of course, in the form of Say's Law (i.e., that supply creates its own demand). It is also possible for theories to transition from 'hard' to 'soft' status over time, as evidence is accumulated indicating that a proposition once accepted as a stylised fact must now be rejected as such, so that models and theories which incorporate the

proposition can no longer be seen as possessing hard axiomatic foundations, and can at best be interpreted as 'soft' Friedmanite logical systems.

Such a proposition was the classical tale of money evolving historically out of pre-existing barter systems of exchange. The idea that a suitable commodity within a barter system could become acceptable as having value in exchange; could then be selected by consensus to be the best available numeraire; and could thereby overcome the transactions costs associated with a barter technology of exchange, permitting an increase in specialisation and the division of labour, is at the heart of orthodox economics. It can be found in both Smith's *Wealth of Nations* and Woodford's *Interest and Prices* (2003), and virtually everywhere in-between.

This view is taken for granted by almost all economists as the generally accepted truth of the origin of money. It naturally encourages the notion that money evolved through commodities, to precious metals, to coinage, to note issue, and finally to credit. It encourages modern theorists like Woodford, and their fore-runners like Wicksell, to imagine a macro-economy with no transactions frictions and no need for a monetary asset. Indeed, as Rogers (1989) has explained, there is no room at all for money in a general equilibrium system. It isn't that modern dynamic stochastic general equilibrium (DSGE) models do not require money – it is that they cannot meaningfully accommodate the institution of money, as I will explain in chapter two.

This is all based on a demonstrable untruth. As such, it is unscientific reasoning. It is a fantasy. It is, to put it mildly, 'soft' economics.

> **"No example of a barter economy, pure and simple, has ever been described, let alone the emergence from it of money; all available ethnography suggests that there has never been such a thing"**
>
> (Cambridge anthropologist Caroline Humphrey, quoted in Graeber 2011, p29)

It is extraordinary that virtually all economics text books for many years have portrayed the development of money out of barter as factual, and that almost all professional and academic economists believe to be factual, such that this myth influences their models and their understanding of the nature and functions of money. There is no support for the neoclassical theory of the emergence of money at all. Yet the story lies in the core of neoclassicism, and the classical economics from which it drew its foundations.

A pre-monetary barter system of exchange almost certainly never existed, and the origins of money lie in debts and taxation, and pre-date a sophisticated division of labour. The first money was more a deliberate creation of governments, and a unit of account and standard of deferred payment, than it was a naturally evolving private medium of exchange. Money itself then facilitated the development of a production and exchange based economy.

Any ‘hard’ model of the economy must take this into account. It cannot be a ‘real’ (non-monetary) model, since such models assume the economy is best thought of as a barter system. Money and finance can never be neutral. The classical dichotomy of the economy into a real sector, where relative prices and the distribution of income are established; and a monetary sector, which can have no long run influence on the economy beyond determining a general price level, is false if not fraudulent. It remains a property of modern DSGE models.

> **“Ricardo offers us the supreme intellectual achievement, unattainable by weaker spirits, of adopting a hypothetical world remote from experience as though it were the world of experience and then living in it consistently. With most of his successors common sense cannot help breaking in — with injury to their logical consistency.”**
>
> (Keynes 1936, p192)

Keynes’ famous quote from the Appendix of Chapter 14 of *The General Theory* is relevant here. If one substituted Lucas or Prescott for Ricardo, this statement could just as well have been made today about modern macroeconomics – where the successors of Robert Lucas would include not only his Real Business Cycle colleagues, but also his contemporary conservative New Keynesians, such as Greg Mankiw and John Taylor, and more progressive New Keynesians such as Paul Krugman and Joseph Stiglitz. For Krugman and Stiglitz, their common sense has been breaking in with increasing degrees of intrusiveness in recent years. Perhaps, like Keynes before them, they are mid-way through the long and painful process of changing their minds.

New Keynesian economics is a very broad church. To be a New Keynesian, all that is required is to accept the long run truth of the Real Business Cycle or Neoclassical Growth Model of the economy, and to recognise the short run logic of 'frictions' of one kind or another, keeping the economy away temporarily from its long run destiny. These frictions can be temporary and minor, if you are a conservative, or persistent and major, if you are a progressive. They can include price inflexibility, nominal or real wage inflexibility, or imperfect and asymmetric information. In principle, they are supposed to be rooted in optimising behaviour, but where justifications based on utility maximisation are hard to come by, the occasional ad-hoc logical inconsistency is permitted. The model, after all, has to be retro-fitted to economic data, so that it provides a reasonable fit to the past, wherever possible.

The problem is that the model, which became known as the 'New Consensus' model, and eventually the Dynamic Stochastic General Equilibrium Model (DSGE), is very 'soft' indeed. It provides no realistic role for money and finance, sometimes no apparent role for governments, and is hopeless as a tool for understanding, anticipating or responding to financial instability and crises. Unfortunately, the intellectual effort used to master the internal logic of the model is so significant, that the issue of realism gets crowded out, and it becomes very difficult to question the axiomatic basis of the model.

What is this New Consensus, New Keynesian Dynamic Stochastic General Equilibrium Model (DSGE), which has come to 'conquer (economic policy) as the Holy Inquisition conquered Spain', if not 'a hypothetical world remote from experience'? I will contend that this is exactly

what it is, and that 'its teaching (has been) misleading and disastrous (as economists have attempted) to apply it to the facts of experience'.

The steps from Walras (1874), to the mathematical general equilibrium model of Arrow-Debreu (1954), with its associated logical puzzles and theorems, to Lucasian rational expectations (Lucas 1972), to the DSGE models of today are the logical consequence of an increasing conviction amongst orthodox economists that the real world can be understood with reference to axiomatic foundations which are generally accepted to be 'patently unrealistic'.

1.4 General equilibrium as 'soft' theory

> **"There are indeed some conditions that must be laid down for an acceptable theoretical analysis of the economy. Most centrally, it must include a theory of market interactions, corresponding to market clearing in the neoclassical general equilibrium theory'."**
>
> (Arrow 1986)

It is worth repeating that at the core of the orthodox neoclassical model, including its DSGE version, is an artisan, barter exchange economy, with no role for money or the general price level. Prices are relative prices, saving is defined as investment (since it exists in the equivalent

form of an accumulated inventory of seed corn for future use), and Say's Law (which Mill translated as 'supply creates its own demand') is the logical result – for in such a system, production is by definition undertaken either for the purposes of current consumption, or investment to allow consumption in the future. It is not just that full employment is assured – involuntary unemployment in such a system is meaningless.

In this mythical core model, as I have argued, are located often implicit but inviolable axioms concerning human motivation, access to information about the future, cognitive capacity, and the power to make decisions of individual economic actors, and the very limited ways in which these actors interact with and influence each other. Axioms which very much are capable of being tested, have almost always been refuted when tested, but which like 'metaphysical propositions' (Robinson 2006 (1962)), are retained nonetheless.

At the heart of all this lies the market clearing axiom (sometimes called the 'neutral money axiom' – Keynes's second classical axiom in *The General Theory*)– the belief that even monetary (non-barter) free market systems converge over time to a stable, full employment, general equilibrium as if organised by an invisible auctioneer and a timeless process of recontracting under barter. All this generates the metaphor of an economic system as a gentle rocking horse – occasionally disturbed by external shocks, but always tending to full employment equilibrium after any shock, with delays in the traverse to equilibrium being the consequence of undesirable 'frictions', sometimes the result of government interference in the market, and which are nearly always inefficient.

Subject to certain assumptions, the existence of a Walrasian general equilibrium was proved to be a logical possibility by Arrow and Debreu, and that equilibrium was shown to have properties which maximised a limited definition of social welfare. These assumptions are not those of the world we live in, of course, so that logical existence and actual existence are not to be equated. Moreover, even the logical existence of a general equilibrium in a world with money and uncertainty has been questioned from the inside by orthodox theorists, and from the outside by heterodox economists.

> **"In a world with a past as well as a future in which contracts are made in terms of money, no (general) equilibrium may exist'**
>
> (Arrow and Hahn 1971, quoted in Davidson 1991, p71)

> **"The model does not deal with time, money, uncertainty, financing of ownership of capital assets, and investment."**
>
> (Minsky 2008 (1986), p4)

Yet the general equilibrium approach has been written (explicitly or implicitly) into almost every introductory, intermediate and advanced macroeconomics textbook ever published. If, in its modern form, it should remain a 'misleading and disastrous' way of thinking about economic societies, this is of great practical importance.

There has remained a form of (pragmatic, if not methodological) choice for aspiring neoclassical macroeconomists between two groups – even if one of these groups came to

dominate policy making by the early 1990s. Keynes anticipated both groups in the Preface to the *General Theory*.

> **"Those, who are strongly wedded to what I shall call "the classical theory", will fluctuate, I expect, between a belief that I am quite wrong and a belief that I am saying nothing new."**
>
> (Keynes 1936, p. xxi)

The first of these groups (the neoclassical fundamentalists – Newclassicals, Real Business Cycle theorists, and New Monetarists) would not refer to themselves in any sense as Keynesian. The second (the New Keynesians of the second neoclassical synthesis, who produced the Taylor Rule and DSGE models, and were in control of policy making during Bernanke's 'moderation') do label themselves as such, but ought not to do so. For a while, it was common to refer to these groups as 'freshwater' and 'saltwater' economists respectively, reflecting the geographical locations of the US universities where many were employed. They are, respectively, the logical purists and those who try to build a bridge from the neoclassical core to the data.

The neoclassical fundamentalists (logical purists) assume: (1) the economy always to be at or near the full employment (Walrasian) equilibrium; (2) for persistent business cycles to be always a reflection of supply side changes in technology or preferences (and therefore consistent with equilibrium); and (3) for anticipated changes in the stock of money or in fiscal policy to have no impact on output and employment – even in the short run. Money is

exogenous; anticipated money is always neutral; the quantity theory of money governs the price level; consumption depends on rationally anticipated permanent income; investment is governed by saving, fiscal measures are subject to 100% crowding out due to Ricardian equivalence; and recorded unemployment is a voluntary, equilibrium phenomenon – a rational, supply side choice. It may be described as frictional or structural, but it can never be due to a lack of demand. For them, Keynes was 'quite wrong'.

> **"The name adopted by the new-Keynesians is most unfortunate, because their ideas have little to do with Keynes."**
>
> (Farmer 2010, p66)

The Neo-Keynesians of the first neoclassical synthesis of the 1960s, and modern-day New-Keynesians of the second neoclassical synthesis, differ on the details of whether the various frictions which can permit some form of temporary disequilibrium cycles while retaining the orthodox core are given ad hoc, or should be derived under rational expectations. However, they share much in common, and have been in positions of influence and power for most of the post 1945 era. They attempt to modify the 'soft' general equilibrium model, to provide it with the best possible fit to real world economic data. In this sense, they are pragmatists.

Their main point of agreement is that economies can remain away from their general equilibrium in a short run period due to these frictions , which potentially provides scope for the use of monetary and/or fiscal policies to 'stabilise' the economy by shifting aggregate demand back towards its long run equilibrium level more quickly than could otherwise be

achieved. In the 1960s, discretionary government fiscal policy was seen as the dominant stabilisation tool; while in the 1990s, the consensus was that stabilisation is best left to monetary policy, implemented by independent central banks, and supported by automatic fiscal stabilisers.

Countless academic papers dealt with the issue of how best to pursue an 'optimal' monetary policy, deriving the 'best' possible solution using a model with no role for money or a realistic financial system. Unsurprisingly, none of these papers identified the development of an increasing degree of financial fragility as balance sheets shifted over time. They were not designed to do so. Financial crises ought not to happen in a general equilibrium world.

For these economists, Keynes said 'nothing new' (he just said what others had said before, but to greater effect). They do not rate Keynes (or any of his like-minded contemporaries or more faithful followers) as a theoretician. They ignore or claim not to understand Hyman Minsky or Paul Davidson. They as yet show little interest in modern Post-Keynesian thought, and the stock-flow consistent macroeconomics and modern money theory that I will maintain is a more useful, 'hard' economics.

Keynes was a great advocate to them, but not a great economist. They are content, at some cost to their logical consistency, to modify the general equilibrium model with 'frictions' to produce apparently policy conclusions which they can describe as 'Keynesian'. It is this

absorption of selected ideas from Keynes into the (neo)classical economics that Keynes wanted to replace which has been described as a neoclassical synthesis.

> **"The way I finally convinced myself was to stop worrying about it (about understanding Keynes's analysis)...I was content to assume there was enough rigidity in relative prices and wages to make the Keynesian alternative to Walras operative."**
>
> (Samuelson, quoted in Davidson 2009, parenthesis as in Davidson)

1.5 Keynesian economics as 'hard' theory

Even since Keynes' death in 1946, it has been understood that what became known as neoclassical synthesis Keynesianism has very little in common with the Keynes of the General Theory, and more broadly what Keynes believed from the early 1930s onwards. None of Keynes' close colleagues at Cambridge, such as Robinson and Kaldor, or their associates, such as Kalecki, subscribed to this synthesis.

It is not only those who knew Keynes well who have disagreed with the mainstream interpretation of his work. Generations of Post Keynesian and other heterodox economists have done the same, stressing the importance of those parts of the General Theory and Keynes' other later work which have been ignored or distorted in the text books.

Central to this is Keynes' discussion of uncertainty, and the distinction between the real world of a 'monetary economy' under uncertainty, and the imaginary world of a 'real (i.e. barter) economy' under a form of perfect foresight of calculable risk. Keynes, for a variety of reasons, arguably made too many concessions to orthodoxy, but it was his intention for move economics back towards being a 'hard', realistic, descriptive, useful discipline.

> **"To understand my state of mind, however, you have to know that I believe myself to be writing a book on economic theory which will largely revolutionise – not, I suppose at once but in the course of the next ten years – the way the world thinks about economic problems."**

(Keynes, letter to George Bernard Shaw, 1st January 1935, quoted in Harrod 1966, p462)

The quote from Keynes' letter to Bernard Shaw is not the statement of a man who believed himself to be just adding another annex to the superstructure of mainstream neoclassical thought – which is all the neoclassical synthesis ultimately became. It is a statement of intent to knock away the foundations of that superstructure, just as Keynes said he was knocking away the 'Ricardian foundations of Marxism' in his letter to Shaw. He was launching a genuine revolution in economic thought.

This first Keynesian revolution, following the crisis of 1929, ultimately endured a creeping failure between the 1940s and 1970s, in spite of the broadly Keynesian policies which characterised those years. The failure to understand the economics of Keynes contributed to the stagflation of the 1970s, and the high unemployment of the 1980s. The economic crisis

which gripped the world after 2007 has created the opportunity for a second Keynesian revolution.

> **"When a scientific school degenerates into pseudo-science, it may be worthwhile to force a methodological debate in the hope that working scientists will learn more from it than philosophers."**
>
> (Lakatos 1970, p122)

If the *General Theory* can be seen as a partially successful attempt to move economics towards being a 'hard' discipline, and if the elements of the 'hard' economics we need for the future are to be found in part amongst the work of heterodox economists, then it really is time for a rethink. The first question is whether 'state of the art' dynamic stochastic general equilibrium models are 'pseudo-science'? The second, and more important, question is whether we can we identify a more useful set of 'hard' models to replace them. The answers to these questions are 'yes' and 'yes'. I aim to justify these answers.

1.6 'Hard' Behavioural and Post-Keynesian economics

We are now better equipped to achieve fundamental changes in economic thought than before, because of the work of modern monetary theorists, psychologists, neuroscientists, and generations of Post Keynesians. We do now have available a set of 'useful' hard models – hence, we can replace 'soft' abstract, 'real', dynamic stochastic general equilibrium with 'hard', more realistic, 'monetary' stock-flow consistent macroeconomics. We can offer

Minsky's 'prince' a different and more useful set of theories, which have some very significant implications for economic policy.

Inspiring this view are two relatively recent and very extensive publications – one the culmination of a lifetime of research and applied monetary economics outside the orthodoxy (Godley & Lavoie 2012 (2006)), and the other a summary of the very significant advances made over the last thirty years or so by psychologists in understanding cognitive processes and decision making (Kahneman 2011).

The first of these publications was – according to Harcourt - recommended as of great significance by Godley himself in a telephone conversation just before his death (this was reported by Harcourt in a seminar at the University of Adelaide in 2012). It has become the standard reference book for stock-flow consistent macroeconomics, which ought to become the successor to general equilibrium modelling as a principal tool of macro-economic analysis for central bankers and governments.

The second has been rightly described in a review by Taleb as 'a landmark book in social thought, in the same league as The Wealth of Nations by Adam Smith and The Interpretation of Dreams by Sigmund Freud'.

These two books, between them, provide realistic foundations and a consistent logical framework for a useful approach to 'hard' economics. The behavioural foundations must draw on Kahneman, and especially on his work with Amos Tversky; while the constraints implied by stock-flow consistency in Godley and Lavoie provide a logical structure for macroeconomic modelling and simulations. This is not to diminish the contributions of complexity theorists, evolutionary and institutional economists, neuro-scientists, and other groups towards the construction of a more useful, inter-disciplinary, pluralist approach to economic analysis in the future.

Godley and Lavoie provide, for the first time, a general framework for Post-Keynesian macroeconomic analysis – a world of interlocking balance sheets; of time moving from an unchangeable past to a fundamentally uncertain future; of production processes taking place over time; of realistic and endogenous financial and monetary processes; of safety margins, such as inventories, access to credit, the need for liquidity, excess production capacity; and the use of norms, conventions and non-optimising decision-making in a world where equilibrium outcomes are rare, and economic activity is generally determined by Keynesian effective demand and only ultimately constrained by supply and biophysical realities.

This balance sheet perspective, inspired by earlier Post Keynesians and most obviously by Minsky, addresses what have always been the principal intellectual weaknesses of a critical realistic approach to macroeconomics in general and Post Keynesian economics in particular, which is the lack of a generally accepted over-arching framework for analysis.

Whereas orthodoxy has always, implicitly if not explicitly, had the Walrasian general equilibrium system of simultaneous equations as a centre of gravity, heterodox economics has enjoyed no such common general framework. Post Keynesians have relied on partial equilibrium for comparative statics, which is strongly advocated by Keynes in the General Theory, and can be defended robustly as superior to Walrasian analysis (as in Rogers, 1989). However, it is incomplete, and not a basis for a generally accepted common analytical framework. Nor is it suited for discussions of dynamic out-of-equilibrium processes.

As Harcourt has said (2001, quoted in Godley & Lavoie, p 3), the partial equilibrium method involves 'looking at parts of the economy in sequence, holding constant or abstracting from what is going on, or at least the *effects* of what is going on elsewhere, for the moment', hoping by doing so in the end 'to bring all our results together to give a full, overall picture'. The method cannot provide a unifying framework for a body of ideas, and is bound to be less attractive as a vehicle of analysis to mathematically inclined economists.

What Godley and Lavoie have done is to build on Godley's earlier work by constructing a viable alternative framework to general equilibrium, where equilibrium is confined to financial markets, and where decision making reflects the informational and cognitive limitations or entrepreneurs and households. There is even a quasi-Walrasian principle in Godley and Lavoie - not an equilibrium principle, but a simple accounting rule used to close models where financial assets and liabilities are in balance across the system, where all financial flows come from somewhere and go to somewhere, and where to put it simply the

numbers have to add up (as in accounting). There are no 'black holes' in Godley and Lavoie, and, hence, there is a greater likelihood of identifying unsustainable developments in balance sheets and the development of growing financial fragility over time.

> **"Our method guarantees that we will always be learning to live in a logically coherent world. And we are prepared to conjecture that, given that there are limits to the extent to which stock-flow ratios can change, the system dynamics of whole economies will pin down their overall behaviour in a way that can override the findings of econometrics as to the putative behaviour of the bits and pieces."**
>
> (Godley & Lavoie 2012, p11)

The quote highlights a very important characteristic of the Godley and Lavoie models, and of stock-flow consistent macroeconomic models generally. As we shall see, it implies that apparent econometric relationships, even if they have appeared to be stable over long periods of time, cannot be sustainable indefinitely if they imply an evolution of balance sheets which is infeasible. This is consistent with what Minsky used to call 'turning the Lucas critique on its head'. Parameters shift not due to the impact of anticipated government policies on private sector rational expectations (as in Lucas), but due to the growing financial fragility of a system of private sector balance sheets which are evolving in ways that cannot ultimately be sustainable.

The development of stock-flow consistent macroeconomic models allowed Godley to identify the fragilities of the euro-zone with great clarity well before its inception (Godley 1992). It also and allowed economists at the Levy Economics Institute to warn repeatedly of the

potential for a major US financial crisis prior to 2007-8, using a model built by Godley and others.

Post Keynesians often appear unaware of or unwilling to accept the extent to which their world view is consistent with the work of modern behavioural economists and psychologists – a consequence in part of taxonomic issues relating to the meaning of two greatly misused words in economics – rationality and uncertainty.

On the other hand, psychologists with an interest in economics are often completely unaware of the existence of Post Keynesian economics, or of any coherent alternative to the orthodox general equilibrium basis for macroeconomics. There is a crucial bridge which remains to be constructed.

What Kahneman and other psychologists have done is to comprehensively deconstruct the psychological basis of decision making, of expectations, and even of motivation within orthodox economic models. In doing so, they have effectively reintroduced psychology into economics – approximately a century after it was largely excluded, or perhaps it is better to say that good psychology was replaced with bad psychology. They have done this not only by identifying anomalies in the predictions of the radical and substantively rational methodological individualism at the core of general equilibrium and efficient market economics, which most of the profession has at least partly understood, but ignored as being marginal relevance. They have also made considerable progress towards the construction of

an alternative and coherent framework for modelling decision making. With notable exceptions, such as Akerlof and Shiller (2009), this progress, based principally on Kahneman and Tversky's Prospect Theory (1979) and derivatives from it, has been almost completely ignored by most professional economists. This is true in spite of the 1979 paper being one of the most widely cited papers ever published in an economics journal, and Kahneman's later receipt of a *Sveriges Riksbank Prize.*

It is still common to encounter young academics at leading universities who have not heard of Daniel Kahneman, and who know nothing about Prospect Theory, but who instead have been steeped in the rival Expected Utility Theory – a theory of choice under risk which has been consistently outperformed by Prospect Theory experimentally and in real world explanatory power for more than 30 years. There is now such a body of evidence to support Prospect Theory that it ought no longer to be ignored.

What has emerged from psychological research is evidence that we are a species evolved to deal effectively with an uncertain, rather than quantifiably risky, environment; that while we are capable of careful analytical thought and complex problem solving, this is effortful and not our automatic response to the many and varied decisions with which we are faced. We use heuristics, conventions and rules, look for associations and benchmarks, and habitually satisfice. We are a highly social species – we are strongly influenced by others (often unknowingly); we have the capacity to empathise (and indeed this is a natural response); we often adopt a narrow perspective to a decision (rather than incorporating all the theoretically

available and relevant information); we, when faced with a problem which is difficult to solve, will substitute a simpler and related problem; and we generally are affected much more strongly by perceived losses than by gains relative to our expectations.

All of this is consistent with the theoretical perspective underlying *The General Theory* – which marks out Keynes as a behavioural economist, as Davidson has stressed (2011). It is also largely consistent with evidence drawn from modern neuro-science, as explained by Glimcher (op. cit.).

We now possess strong intellectual and empirical evidence to support the model of decision making under incomplete information which is at the base of Post Keynesian economics, and for those parts of Keynes's General Theory which mainstream economics collectively engineered out of economic theory after 1945. The forces leading to the elimination of Keynes from post-war Keynesian economics are described by Davidson (2007, chapter 12), and the steps taken by Hicks, Hansen, Samuelson, Modigliani, Patinkin, Tobin and others in the distortion of Keynes's work and its synthesis with general equilibrium modelling are discussed in Minsky (1975, chapter 2). We are now in a position to rehabilitate Keynes, so that the subtitle of Skidelsky's 2009 book, 'The Return of the Master', might be justified on logical and theoretical grounds, and not purely as an expedient response to recession.

If there was ever a prospect worth thinking about in this discipline, this is surely one. The macroeconomics which results from a proper understanding of these elements is very

different from that of either the first or second neoclassical synthesis, or any of the mainstream economics of the past 250 years. It suggests a different way of thinking about economic policy, and potentially a radically different approach to macroeconomic management – one more consistent with a modern interpretation of the economics of Keynes.

This alternative framework is consistent with a very different approach to economic management than has been used since 1980. Furthermore, it is, in some respects, an approach to managing economies which has never been used.

It is based on general and realistic foundations, its internal logic is compelling, and its predictions have not been shown to be unreliable. It allows for the discussion of policy questions which cannot be addressed within a general equilibrium framework. It outperforms the dynamic stochastic general equilibrium model in terms of coherent explanations of economic phenomena, in the short run and the long run. It is the economics of a system which, within limits, I potentially highly unstable, is not attracted to any stable equilibrium, and is in need of appropriate institutions to thwart this instability. These can include social conventions, but also effective regulation (especially financial regulation), and fiscal and monetary policy. Effective policy making is not about trying to optimise anything – it is about mitigating the adverse consequences of instability in an uncertain and evolving system.

The most surprising fact is that the relevant theories are simple to understand, so that the problems of effective economic management should have much less to do with the selection of the appropriate theories, and everything to do with the detailed implementation of those measures suggested by these theories, and by the evidence which can be presented in their favour. Economists should become a lot less like theoretical physicists seeking for a form of mathematical beauty, and a lot more like practical engineers, building in tolerances and allowances for an uncertain and potentially unstable world. Alternatively, we might agree with Keynes in his *Essays in Persuasion*.

> **"If economists could manage to get themselves thought of as humble, competent people on a level with dentists, that would be splendid."**
>
> (Keynes 1932, p373)

It is the responsibility of economists who are aware of these issues to make at least some contribution to encouraging a second Keynesian revolution. It is my intention in this study to make a contribution towards the consideration of the elements that such a revolution should incorporate.

My first step will be to discuss how orthodox economics evolved over time to become the very 'soft', often limiting, and frequently misleading, framework for understanding economic issues which so many observers regard it to be today.

"The vast majority of economists tend not to question existing orthodoxy during periods of relatively satisfactory economic performance in real-world economies – even when the orthodox analysis is shown to be logically faulty and/or unrealistic. Only in periods of economic crisis will a significant number (but even then not necessarily a majority) of economists search for new, more relevant theoretical approaches for analysing economic problems."

(Davidson 1991, p25)

Chapter Two

Orthodox (Neoclassical) Macroeconomics

"My view is that improvements in monetary policy, though certainly not the only factor, have probably been an important source of the Great Moderation. In particular, I am not convinced that the decline in macroeconomic volatility of the past two decades was primarily the result of good luck."

(Bernanke 2004)

2.1 'Improvements' in Monetary Policy

The 'improvements in monetary policy' to which Bernanke was referring in his speech, oblivious of a gathering financial storm, were partly the inspiration of, and partly inspired by the 'new consensus' theoretical model in macroeconomics, which became widely accepted and applied during the 1980s and 1990s. It is the centre piece of New Keynesian economics, and provides a theoretical justification for the variety of Taylor-like rules used to describe, guide and justify the accepted 'state of the art' approach to monetary policy making, from the early 1990s until the storm clouds broke in 2008.

It is worthwhile listing a number of fallacies which had come to be accepted as probable facts within the economics profession during the latter part of Bernanke's Great Moderation:

- That the stagflation of the 1970s could be explained as a failure of Keynesian economics and that there was no alternative explanation of the economic data of that decade which was equally plausible. I will return to this point in my final chapter.

- That Keynesian economics could be equated with money illusion and wage inflexibility; the Philips Curve; the multiplier; a fine tuning approach to fiscal policy; and a neglect of monetary policy and the supply side of the economy.

- That the period from 1992-2007 could be described as the most successful period in terms of key macroeconomic variables in US and world economic history; and that this could more than anything else be attributed to effective monetary policy.

- That financial and other deregulation in a world of increasingly efficient and globalised financial markets could permit sustainable economic growth along a stable equilibrium growth path (with the term 'sustainable' being (mis)used in a narrow macroeconomic sense, and not in an ecological context).

- That financial crises were the result of imprudent government economic policies in an economy which otherwise tended towards a stable general equilibrium.

- That unemployment and underemployment of labour was largely an equilibrium condition, influenced by productivity and preferences, and frictions such as search costs, efficiency wages, trade unions, minimum wage laws, and labour market regulations.

- That the problems of economic cycles had been largely solved, and economists could turn to other issues.

These beliefs were not based on any convincing empirical evidence, and for what such observations are worth, rates of unemployment and underemployment were lower and the average rate of growth of real output in countries such as the USA, and indeed in the world economy, was greater from 1950-1970 than during the 'Great Moderation'. Moreover, the distribution of income within such economies became more even during the earlier period, and more uneven during the latter; and financial systems remained relative robust in the earlier period, while there was growing financial fragility during the latter.

Taking Australia as an example, it is not clear that the performance of the progressively reformed Australian economy after 1990 clearly outshines that of the Keynesian 1960s, and in terms of the pursuit of economic growth and full employment it is not surprisingly obvious that the opposite is very much the case:

Table 2.1: Australian Average Real GDP Growth; Average CPI Inflation; Average Official Unemployment; by decades; 1960-1915

Australian Data, ABS	**Real GDP Growth**	**CPI Inflation**	**Unemployment**
Period	annual average, %	annual average, %	annual average, %
1960-70	5.0	2.5	1.4
1970-80	3.3	10.2	3.4
1980-90	3.4	8.3	7.6
1990-00	3.2	2.2	8.8
2000-10	3.2	3.2	5.4
2010-15	2.6	2.4	5.6

Source: *Australian Bureau of Statistics*

Mitchell, Wray and Watts provide data for average annual economic growth for a number of other countries, and the implication is the same, which is that the 'great moderation' was not necessarily so great at all, in terms of anything that actually matters:

Table 2.2: Average Annual Real GDP Growth by decades; 1960s-2015

Table 2.1 in Mitchell et al	**Germany**	**Italy**	**Japan**	**Spain**	**UK**	**USA**
Period	**%**	**%**	**%**	**%**	**%**	**%**
1960s	4.5	5.7	10.2	8.6	3.1	4.7
1970s	3.3	4	5.2	5.3	2.6	3.2
1980s	2	2.6	4.4	3	2.7	3.1
1990s	2.2	1.5	1.5	2.8	2.1	3.2
2000s	0.8	0.5	0.6	2.7	1.9	1.8
2010-15	2	-0.5	1.4	-0.3	2	2.1

Source: Table 2.1 in *Mitchell et al*, forthcoming

This is not to say that the economic and social conditions of the 1960s could have been sustained or reproduced, but it is to suggest that the great claims made for economic policy

making in the late 1990s and the early years of this century were overblown. And all the while, household debt and financial system fragility were increasing, without this being of apparent concern to economists and policy makers of the 'new consensus'.

2.2 'Real analysis' as 'soft' economics

The 'new consensus' is also occasionally referred to as the second, or 'new neoclassical synthesis' (Goodfriend and King 1998), which reminds us that it is the intellectual heir of both the earlier (first) 'neoclassical synthesis', which was dominant in the earlier period, and of the neoclassical foundations of that earlier model.

That the model has neoclassical foundations means its roots go back to Walras (1874), and, as I have already explained, to the fact that the full employment property of the Walrasian model can also be found in the classical economics of almost a century before.

The modern New Keynesian consensus, when written down in mathematical form, is the Dynamic Stochastic General Equilibrium model – although it might be more correct to use a plural term, as it is a family of models, or an approach to modelling, rather than a single and unique set of structural equations. I will adopt the singular term, partly because permissible versions of this model vary only superficially.

The most authoritative and detailed statement of its theoretical foundations is *Interest and Prices,* by Michael Woodford (2003). The most widely cited brief description of the model and its recommendations for the conduct of monetary policy is *The Science of Monetary Policy: A*

New Keynesian Perspective, by Clarida, Gali and Gertler (1999). The most influential extensive version of the model is perhaps *The Global Integrated Monetary and Fiscal Model* of the International Monetary Fund (Kumhof et al). I will base my discussion of the DSGE Model mainly on Woodford, on Clarida et al., and on a broadly sympathetic behavioural critique of the model by De Grauwe (2010).

The reaction of the uninitiated to the extensive IMF model might be one of surprise that anyone would expect a macroeconomic model using what Woodford describes as 'the cash free limit' (i.e. not including any monetary asset) to provide a useful basis for policy evaluation, especially at this point in history. And yet that is the purpose of this model, complete with its apparently impressive mathematics. Money, as a nominally safe and perfectly liquid asset, is apparently unnecessary. Furthermore, it has always been unnecessary, and indeed out of place, in general equilibrium models.

> **"The most serious challenge that the existence of money poses to the theorist is thus: the best developed model of the economy cannot find room for it."**
>
> (Hahn 1983, p1)

Not only is money unnecessary in a DSGE model, and in its general equilibrium forebears, but according to the logic of the model there is no room for anything approximating real world money, or for that matter a realistic finance sector, fundamental uncertainty, or historical time. These models are, in their purest form, by definition, perfect and friction free, certainty equivalent, barter models, complete with a Walrasian auctioneer and a timeless auction process, occurring at the beginning of an infinite logical time. There can be no purpose for

money in such a model, either in the form of an asset or as a pure numeraire, and consequently a general price level ought not to exist. Moreover, there can be no meaningful distinction between real and nominal magnitudes, since the notion of a nominal value in a general equilibrium system is impossible to define. The discussion of inflation, or the costs of inflation, within such a framework, is challenging, to say the least. Understanding the benefits of pervasive forward contracts with pre-determined ('sticky') prices is impossible.

Money can only be introduced into such a model by assuming that the Walrasian auctioneer is asleep on the job, so that a monetary asset has to exist in order to make up for the inefficiencies of that auctioneer, or through an arbitrary 'cash-in-advance' constraint. Either money finds its way mysteriously into the household utility function, where it has no place to be in a model based on the exchange of services and goods for goods and services, or it becomes a source of inefficiency itself, as a friction. This is all something of a muddle, and reflects a very stubborn and long-lasting refusal to face facts, just as Goodhart (2009) has said.

Money, as in the safe and fully liquid liabilities of monetary sovereign governments and their central banks, and the liabilities of commercial banks which are cleared at par using central bank liabilities, and which can be used to discharge tax and other obligations to those monetary sovereigns, does, obviously, exist. In addition, realistic monetary and financial institutions and markets have significant and long lasting effects on the paths of output, employment and the general price level through time. Money can never be 'neutral' in real life, either in the short or the long run; whereas in the DSGE model, if money is there at all, it must exhibit long run neutrality. The problem lies not with 'the existence of money', but with what neoclassical economists take to be 'the best developed model of the economy'.

Something is up with orthodox macroeconomics, and a short description of its historical development shows the muddle has been remarkably persistent – in fact, virtually ever present.

The problem is that almost all macroeconomic theory, in spite of its evolving and deepening architectural complexity, continues, more or less implicitly, to employ as its foundations the same money-less Walrasian barter system of Real Analysis. It should always have been based on some form of Monetary Analysis, as money and finance have always been driving forces in capitalist economies. Instead, it has, in spite of the efforts Keynes made in and immediately subsequent to *The General Theory* to change this, continued to be Real Analysis.

> **"Real Analysis proceeds on the assumption that all the essential features of the economy can be understood in real terms. Money is nothing more than a veil to be drawn aside to reveal these real forces at work. Monetary analysis on the other hand, proceeds on quite the opposite assumption. Money is not a veil, but an integral part of the capitalist process. The face cannot be analysed independently from the veil. Hence Monetary Analysis attempts to integrate real and monetary forces in the determination of long period equilibrium and it is in this tradition that the foundations of monetary theory are to be found. At this fundamental level the failure of all the varieties of neoclassical monetary theory can be traced to the fact that they fall within the tradition of Real Analysis."**
>
> (Rogers 1989, p4)

Perhaps the first genuinely macroeconomic model of the economy was offered by Wicksell, in his *Interest and Prices* (1898). The use of this same title by Woodford in his description of the most recent macroeconomic model, in 2003, is intended to emphasize the essential

continuity of thought in macroeconomics over more than a century. They are both 'within the tradition of Real Analysis'.

The use of the word 'real' in this context, for a completely unrealistic depiction of an economic system, is one among many examples of the misuse of language in economics, which has the potential to mislead and bias the discussion. It might be better to drop the term 'real analysis', and instead to refer to the logical analysis of a mythical, timeless and non-monetary economy. After all, this is what the real analysis lying at the root of orthodox neoclassical macroeconomics represents.

Wicksell accepted the disaggregated Walrasian model of the economy, but was concerned about the manner in which the classical Quantity Theory of Money was commonly appended to the barter system, in the neoclassical dichotomy, to determine the price level. Wicksell was aware that, even with a gold standard, the practical business of central banking concerned the day to day management of bank liquidity with the aim of stabilising the 'bank rate' at the central bank's desired level. The pure Walrasian barter model naturally lacks even the concept of an interest rate, unless it is imagined that every commodity in the system has its own unique rate of interest (Rogers 1989). The addition of the Quantity Theory does nothing to rectify this failing.

Wicksell introduced the notion of an aggregate general equilibrium model with endogenous but still neutral money. He divided production into consumer goods and capital goods, and income into consumption and saving. He then set the rate of interest at the point where saving out of income equalled capital investment. This of course is an identity, rather than an

equilibrium condition. The rate of interest would be set at its 'natural' (or equilibrium) level where the equality of saving and investment was consistent with market clearing at a stable price level.

A central bank could reduce the bank rate below its natural rate, encouraging investment by entrepreneurs at the expense of savers, but only at the cost of upward pressure on the price level. The natural rate itself, as always in neoclassical macroeconomics, reflects the real marginal productivity of capital and marginal rate of time preference amongst households. Wicksell's natural rate of interest fits nicely with Fisher's equilibrium real rate of interest (Fisher 1930), and all versions of the loanable funds theory of interest-rate determination. They all assume full employment to be the norm. Like the modern 'state of the art' DSGE model when money is included within it, Wicksell's model allows for endogenous money and temporary changes in the rate of interest. However, 'money is a veil', with output and the natural rate of interest determined by real forces which lie beyond the influence of any monetary authority.

Wicksell's model, like all later neoclassical macroeconomic models, is beset by logical problems of aggregation, and particularly the well-known Cambridge capital controversy (Rogers, 1989, chapter 2). The main problem with all such models though, is that they are examples of Real Analysis, and as such are not applicable to the world we actually live in. They are 'soft' models of unreality, as opposed to 'hard' models.

It is interesting to note the similarity between Wicksell's interest rate rule, as identified by Woodford, and the micro-founded Taylor rules embodied in recent 'state of the art' models.

Wicksell's rule required the rate of interest to be increased whenever prices had risen, and to be reduced when prices had fallen. There is an implicit price level target here, rather than an inflation target, but otherwise Wicksell's rule is equivalent to a Taylor Rule with a zero weight for output gaps ('strict inflation targeting'). They both include a 'natural (real) rate of interest', which is derived from the marginal rate of time preference of households and the marginal productivity of capital. Both Woodford and Wicksell are practitioners of the same tradition.

> **"An economy which uses money but uses it merely as a neutral link between transactions in real things and real assets and does not allow it to enter into motives or decisions, might be called – for want of a better name – a real exchange economy. The theory which I desiderate would deal, in contradistinction to this, with an economy in which money plays a part of its own and affects motives and decisions and is, in short, one of the operative factors in the situation, so that the course of events cannot be predicted either in the long period or in the short, without a knowledge of the behaviour of money between the first state and the last. And it is this which we ought to mean when we speak of a monetary economy."**
>
> (Keynes 1933)

Keynes did not invent Monetary Analysis. The monetary circuit theory of Marx, which has inspired modern circuitists, Post Keynesians and modern monetary theorists, is an example of monetary analysis which pre-dates Keynes. Moreover, the Keynes of *The General Theory* can be criticised for not consistently or clearly enough emphasizing the revolutionary implications of the Monetary Analysis he advocated to his colleagues. There are many features of the book that later Post Keynesians came to regret – including his acceptance of

diminishing returns, the neoclassical production function and perfect competition, and especially his use of exogenous money in his discussion of monetary policy.

However, Keynes left no doubt that *The General Theory* was an attempt to shift economics from Real to Monetary Analysis. As such, it marks the first clear discussion of the implications of uncertainty for decision making, money, finance, effective demand and unemployment in a modern, monetary economy. Keynes (1939) was aware of the concessions he had made to both his neoclassical contemporaries and his own pre-conceptions, as is clear from his response to the criticism from Dunlop (1938), and Tarshis (1939). For Keynes, the most significant step in the development of a more realistic and useful model of the economy was the incorporation of fundamental uncertainty, and of its implications for the role of liquidity, the functioning of financial markets, the instability of private investment spending, and the potential for prolonged mass unemployment.

The General Theory was an attempt to shift economics back from being a 'soft' discipline to a 'hard' one, and in that sense was in the tradition of Adam Smith rather than that of David Ricardo. Since it is an example of Monetary Analysis, further detail does not belong in this chapter, and I will reserve further discussion of the economics of Keynes to chapter three.

2.3 Softening up 'Keynesian economics'

Though the Keynes of *The General Theory* does not belong in a chapter on Real Analysis, Real Analysis is the basis for almost all of what became known as 'Keynesian economics',

including both the first and the second neoclassical syntheses, which between them have dominated academia and policy making for most of the period since 1945.

The undermining of *The General Theory* as Monetary Analysis started almost immediately, with the development of the ISLM model (Hicks 1937). This model provides an analysis of the demand side of the economy as one consisting of a goods market, a money market and a bond market. The application of Walras' Law then allows for the omission of one of these markets when conducting comparative static analysis. This leaves the IS (goods market equilibrium) and LM (money market equilibrium) equations as the frame used by almost all economists to understand aggregate demand from the 1940s until at least the 1970s. The financial system is hidden behind the LM curve. This model, or something very close to it, is still the frame used in most undergraduate macroeconomics teaching today, and is at the back of the minds of almost all economists. It helped set the scene for the re-establishment of the classical dichotomy between real and monetary factors.

The ISLM model was initially seen by Keynes as harmless and even potentially useful, but was the first step in the innocent fraud of Real Analysis masquerading as the economics of Keynes, which has continued right up to the present day. The ISLM model has a variety of logical flaws and limitations, most of which I will ignore here. The worst omission is that it ignores the role of expectations and fundamental uncertainty, which are central to Keynes' Monetary Analysis.

As Minsky (1975, p57) put it, '*Keynes without uncertainty is like Hamlet without the Prince'*.

ISLM is deficient in other ways. Firstly, it ignores or abstracts from the shifting and inter-connected balance sheets which drive the development over historical time of financial fragility and financial instability. Secondly, it encourages a neglect of liquidity, a confusion of stocks with flows, and the revival of the loanable funds fallacy. Consequently, while it is consistent with the Walrasian analysis Keynes was aiming to replace, it is inconsistent with the 'financial Keynesianism' of *The General Theory*, as explained by authors such as Davidson (1978) and Minsky (1975), and by Keynes himself (1937a).

ISLM can be manipulated as a basis for justifying a fiscal expansion in a recessionary period, particularly when interest rates are at the 'lower bound', just as Krugman has regularly been arguing through his New York Times blog in recent years. In this respect, Krugman is right to claim that some elements of orthodox macroeconomics can be used to justify sensible macroeconomic policies. However, ISLM is useless when it comes to identifying the potential for a future financial crisis. As with all orthodox static equilibrium models, a crisis can only arise from an exogenous shock. This is not a genuinely dynamic model with the potential for an endogenous private sector crisis.

Towards the end of his life, Hicks voiced doubts on similar grounds regarding his own creation, coming to see it as potentially of value in a classroom setting, but of limited utility beyond that.

> **"I must say that that diagram [IS-LM] is now much less popular with me than I think it still is with many other people. It reduces the *General Theory* to equilibrium economics."**
>
> (Hicks 1976, p290)

All that it is necessary to add to the equilibrium ISLM Model to make it effectively Walrasian is perfectly flexible prices and a natural (or full employment) equilibrium level of real income, with aggregate demand, as determined by the intersection of the IS and LM curves, equalling natural real income. Should a negative demand shock cause an incipient fall in aggregate demand relative to the natural equilibrium income, the price level will decrease. This will increase the real money supply and perhaps also the real value of any private sector net financial wealth which is defined in nominal terms. The first of these effects – sometimes misnamed the Keynes effect – shifts the LM curve downwards and to the right; the second effect – the Pigou or Patinkin effect – shifts the IS curve upwards and to the right.

Of course, for the reasoning to be fully Walrasian, it is relative wages and prices which would have had to be flexible. Either route to full employment is sufficient, and they can be made identical by imagining money to be a commodity within a Walrasian system (what else could it be?), so that a fall in the price level equates to an increase in its relative price, and a decrease in the relative prices of all other commodities, compared to money.

With perfectly flexible prices, the economy is instantaneously restored to its natural, or full employment state, as if facilitated by an invisible auctioneer, able to practice a repeated re-contracting exercise in a timeless vacuum. Aggregate supply is fixed by the real forces of technology, productivity and preferences, and remains untouched by money, finance, uncertainty and 'animal spirits'. There is no path dependence, no hysteresis, and no historical time at all.

For a given IS curve, the model retains Wicksell's natural rate of interest within a loanable funds framework, which are concepts rightly rejected as non-existent and unhelpful by Keynes. With flexible prices, there is no role for either fiscal or monetary policy to play in maintaining or stabilising output and employment.

To introduce a role for Keynesian demand management policies, it is necessary to introduce the friction of downward sticky wages and prices, so that real income cannot rapidly traverse to its natural level following its disturbance by a shock. If prices are sufficiently sticky, a negative shock to demand can have long lasting consequences for output and employment. Under these circumstances, it became respectable to argue for an expansionary fiscal policy and the Keynesian multiplier process, while never questioning the underlying Walrasian foundations of what remained a model of Real Analysis, with its long run natural, full employment general equilibrium.

There was nothing very revolutionary about this 'bastard Keynesianism' (as Joan Robinson famously put it). Mass unemployment had been a regular feature of capitalist economies in the 1920s and before. Business cycles were not invented in the 1930s. There were plenty of 'Neo-Keynesians' before *The General Theory.* Amongst them we can rank the Keynes of the 1920s - the man who said 'In the long run we are all dead' in chapter three of *A Tract on Monetary Reform* (1923), with reference to what is clearly a neoclassical model of sticky prices. Sticky wages and prices are not the cause of persistent unemployment in *The General Theory*.

It is instructive to recall what Samuelson had to say about the introduction of sticky prices into the neoclassical system.

> **"The way I finally convinced myself was to stop worrying about it' (about understanding Keynes's analysis)...I was content to assume there was enough rigidity in relative prices and wages to make the Keynesian alternative to Walras operative."**
>
> (Samuelson, quoted in Davidson 2009, p181, parenthesis as in Davidson)

The greatest of the economists of the first neoclassical synthesis thus admitted that he had stopped worrying about Keynes's Monetary Analysis, and that he had instead taken the long established Real Analysis model of the economy in which he had been educated, and added enough price and wage rigidity to justify Keynesian demand management policies.

This was enough to produce the Neo-Keynesian text-book model, with the price level on the vertical axis and real output on the horizontal, consisting of a downward sloping AD curve and an L-shaped AS curve, where the AS curve tends towards being perfectly inelastic at full employment. The addition of bottlenecks and structural unemployment produced an upward slope for AS short of full employment.

The discovery of the Phillips Curve appeared to offer support to the Neo Keynesian view of the economy, and therefore support for fiscal fine tuning (shifting the IS curve), with the aim of stabilising the economy at a point acceptably close to full employment, but without

significant demand pull inflation. The addition of small stochastic shocks to the model provided a logical basis for such fine tuning.

Their neglect of Keynesian uncertainty, and attachment to general equilibrium reasoning, gave the Neo Keynesian economists of the first neoclassical synthesis of the 1950s and 60s essentially the same blind spots and over-confidence as their New Keynesian successors of the second synthesis of the 1990s and 2000s. They were unaware of, and uninterested in, the need to redesign and reform institutions to maintain non-inflationary full employment, as social attitudes, the financial system, and the world economy evolved over time. They were unable to anticipate, or apparently react to, the stagflation of the 1970s. There had been too much faith in the continuing stability of historical statistical relationships, and not enough emphasis on the management of a potentially unstable economy and social system evolving through historical time.

2.4 From 'soft' to 'supersoft' economics

Meanwhile, during the early years of the first synthesis, the mathematical existence and properties of the general equilibrium system had been explored by Arrow and Debreu, and others, including Samuelson himself; and the aggregate version of the general equilibrium model, complete with its standard two factor aggregate production function, had been used by Solow and Swan to build neoclassical growth theory. Both Solow and Samuelson were leading Neo Keynesians, and also firmly grounded in neoclassical Real Analysis.

"**I am also a neoclassical economist, but I am content with the Keynesian label**."

(Solow, interviewed in Klamer 1984, p 131)

Then along came the apparent break down of the Neo Keynesian Phillips Curve, and the associated failure of Neo Keynesian econometric models to provide useful forecasts or guidance for policy makers. There was a crisis in Neo-Keynesian economic theory.

"**The crisis - in economic theory - has two aspects: one is that "devastating logical holes" have appeared in conventional theory; the other is that conventional theory has no explanation for financial crises**."

(Minsky 1982, p91)

Economists did not turn for answers towards the Monetary Analysis of people such as Minsky and Davidson. Instead, a model which purported to explain contemporary events, and to do so in a manner which was faithful to the Arrow-Debreu-Walras Real Analysis, seemed to many an attractive alternative. I will argue that, as it had done before, economics again moved in the wrong direction. Not from 'soft' to 'hard' economics, but from 'soft' towards, eventually, 'super-soft' economics.

A Monetarist alternative to Neo-Keynesian economics had been championed by Milton Friedman from the 1950s. Friedman disputed the impact claimed by Keynesians for discretionary fiscal policy on aggregate demand, and argued that monetary policy, and in particular control of the rate of growth of monetary aggregates, was the key to the control of

demand and of inflation. Inflation was ‘always and everywhere a monetary phenomenon’. In his view, the major source of instability in what should be a stable general equilibrium economic system was mistaken government and central bank policy itself.

Some authors viewed this as a debate about the gradients of the IS and LM curves, with Neo Keynesians viewing the LM curve as the more interest-elastic and Monetarists implicitly assuming the IS curve to be so (Tobin 1972).

Friedman (1972) denied that the weakness of Neo-Keynesian economics had anything to do with the relative gradient of the curves in Hicks’ model, claiming instead that discretionary fiscal policy was ineffective in moving the IS curve significantly. Barro (1974) later made a similar claim, basing his argument on Ricardian equivalence, to which I shall return below. Briefly, applied to stimulative tax cuts, Ricardian-equivalence is based on the idea that tax cuts today lead far-sighted households to anticipate higher tax liabilities in the future, causing them to save temporary tax cuts, and frustrate a discretionary fiscal expansion. One of the foundations of Ricardian equivalence is Friedman’s Permanent Income Hypothesis, which itself is founded on Expected Utility Theory. These theories have proved remarkably persuasive to most academic economists, in spite of the evidence that they have little empirical support and are, especially in the case of Ricardian equivalence, beset by logical flaws.

I will explain that expected utility theory, the permanent income hypothesis, Ricardian equivalence, and not only the practice but even the theoretical possibility of successfully targeting the growth of some measure of the money supply, are all at best viewed as ‘soft’

economics, and are better regarded as highly misleading and dangerous ideas when used as a basis for making policy recommendations. They are based on a series of misconceptions, which are mutually reinforcing, and consistent with an underlying Real Analysis general equilibrium framework.

The most persistent of the monetarist misconceptions is that of equilibrium unemployment - the Natural Rate of Unemployment (Friedman 1968; Phelps 1967). In a general equilibrium production system, there will be some 'full employment' or natural level of output, which in a competitive system depends on preferences, endowments and production technology. Real wages depend on marginal productivity, and optimising workers decide how much to work based on balancing the marginal utility of leisure against the marginal utility from the real consumption which additional labour supply makes possible. The substitution of the 'natural rate hypothesis' for the concept of full employment has been Friedman's most enduring theoretical innovation.

> "**The 'natural rate of unemployment', in other words, is the level that would be ground out by the Walrasian system of general equilibrium equations**"
>
> (Friedman 1968, p9)

Friedman argued that changes in tax and social welfare systems had adversely influenced incentives, and that growing trade union power and a variety of government policies restricting competition had adversely affected productivity. Consequently, the natural rate of equilibrium unemployment had increased. Unemployment was an equilibrium phenomenon,

not a market failure caused by price rigidities, and since the unemployment rate was the result of decisions by optimising households and firms, there was no justification for using either fiscal or monetary pump priming to reduce its level. Indeed, an increase in the rate of growth of the money supply could only temporarily reduce unemployment below this natural rate, according to Friedman, and consequently could only temporarily increase output above its natural level, by temporarily fooling households about the real value of the available wage.

The cost of this was an acceleration in the rate of inflation, which must persist until unemployment reverts to its natural level once again, at which point the inflation rate and inflation expectations will have both increased. This is the basis for the Expectations Augmented Phillips Curve, which in a modified form remains the aggregate supply function embedded into today's 'state of the art' models.

It is an absurdly counter-intuitive basis for a theory, and is flatly contradicted by empirical evidence, in the sense that it implies workers voluntarily quit their jobs during periods of rising unemployment. To Friedman, this was unimportant, as I have already said. He believed firmly in 'soft', 'as if' economics. He was content with the idea that his model could make accurate predictions, and uninterested in the realism of its axiomatic foundations.

His definition of natural output and unemployment as levels consistent with stable inflationary expectations, and the replacement of the concept of full employment with that of the natural rate hypothesis, became permanently embedded into orthodox neoclassical macroeconomics. It provided an apparent justification for the abandonment of full employment as a policy objective, and for a focus on what became known as supply side

measures, which were supposed to improve incentives and generate productivity growth (OECD 1994). Evidence suggests that these measures instead contributed to rising inequality, which has had the opposite effect on growth (Cingano 2014).

Since, as Friedman indicates, there is an efficient general equilibrium system underlying his analysis, which would be disturbed only by small random shocks in the absence of government policy errors, Friedman recommended the use of a money supply rule to eliminate inflation. He reinstated the Quantity Theory of Money, and believed both in the feasibility of monetary base control, and in the stability of the banking multiplier, alongside the money neutrality implied by all Real Analysis general equilibrium models. I will explain that monetary base control is infeasible, under the monetary arrangements in place across virtually the whole of modern economic history, and that the banking multiplier is a myth (Bindseil 2004 and 2004a; Goodhart 2009). In direct contrast, I will explain that it is the essence of 'hard' Monetary Analysis, that money correctly defined is never and could never be 'neutral'.

If Friedman's theorising was 'soft' economics, it was rapidly to be supplanted by 'supersoft' economics. Real Analysis becomes 'supersoft' when it incorporates the rational expectations hypothesis, and extremely so with the development of the Real Business Cycle model of the economy. Taking a model with unrealistic axiomatic foundations, and then insisting on pursuing the internal logic of that model to the fullest possible degree creates an absurdity, even if along the way it might generate the occasional potentially useful insight.

Robert Lucas (1972) built on Friedman's analysis by replacing Friedman's mechanical adaptive expectations, which allowed for workers to make mistakes by being slow to adapt their expectations of inflation to the consequences of government policy decisions, with the more logically consistent rational expectations. There was a transition from Monetarism to Newclassical Economics. This was a transition from a government-induced business cycle model to a model with no meaningful business cycle theory at all.

Economic actors with rational expectations do not make avoidable errors. They are able to construct approximately correct objective probability distributions of future economic conditions, using the 'correct' model of the economy of which they are a part for the purpose. They are never fooled by pre-announced government policy decisions. No deliberate and announced acceleration in the rate of growth of the money supply could cause firms or workers to make mistakes in Lucas' model. Only unanticipated changes in the money supply, or exogenous shocks, could cause output to deviate from its natural, and optimal, level.

This implied the famous Lucas 'surprise' aggregate supply function; the even more famous 'Lucas Critique' of what were then the traditional extensive Neo-Keynesian econometric forecasting models (Lucas 1976); and Kydland and Prescott's time inconsistency problem for monetary policy (1977). They are well-known features of the canon of an orthodox economics education today. The Ricardian equivalence mentioned above also has somewhat firmer logical foundations in a model with rational expectations.

There is, of course, no evidence that people have rational expectations, and plenty of evidence that they don't. Indeed, in a world of fundamental uncertainty, the rational

expectations assumed by almost all neoclassical economists since Lucas are an impossibility. This is material to be addressed in chapters three and four.

General equilibrium models are examples of 'soft' economics, as they imply a lack of interest in realism: the incorporation of rational expectations into such models is 'supersoft', as it implies a positive preference for absurdly unrealistic axiomatic foundations, and indeed Lucas has admitted to this. It is what Samuelson called Friedman's 'F-twist', but perhaps ought to be named the 'L-twist' in honour of Lucas, who took it much further than Friedman.

Once economists had gone this far, the final step in the descent into 'super-softness' was inevitable. This involved the explicit provision of what had always previously been implicit roots for 'super-soft' neoclassical macroeconomics in 'soft' microeconomics. In its pure form, it was Real Business Cycle Theory.

In one sense, Real Business Cycle Theory was a reaction to an obvious empirical failing with Newclassical Economics. Whereas there was room in the Neo Keynesian economics of the first neoclassical synthesis for economic cycles, of the mechanical multiplier-accelerator type, and in Monetarism for policy-induced cycles, in Newclassical economics, the only possible disturbances to the natural equilibrium are random, non-serially correlated shocks. Uncorrelated shocks, of course, do not produce cycles. More clearly than most of these 'soft' neoclassical models, there is obviously no business cycle at all in the Newclassical version.

Real Business Cycle Theory (Kydland and Prescott 1982) provided a solution – cycles as equilibrium phenomena. If cycles in output growth and in employment are a consequence of

random fluctuations in productivity growth, and perhaps also in the preferences of economic actors, then it is possible to combine perfect price flexibility, perfectly competitive markets, perfectly rational expectations, and yet still provide an 'explanation' for business cycles. Such explanations rely on large pro-cyclical swings in real wages across the cycle; fully 'rational' workers allocating their time between labour supply and leisure optimally over time; and, of course, the tendency for workers to voluntarily withdraw their labour during a recession, and regain their willingness to work during a recovery.

Lucas and other Newclassicals, and the closely associated efficient market theorists of financial economics, had brought more mathematical content and more pure mathematicians into macroeconomics. Real Business Cycle theory moved the discipline further in the same direction, and greatly appealed to the large number of people moving into the profession who preferred a sort of (arguable) beauty over truth. That the theory faced insuperable empirical challenges was obvious at its inception. Even its core prediction of consistently pro-cyclical fluctuations in real wages across the cycle is not supported by the data, as is now generally accepted. That it shares the same logical problems as all aggregate general equilibrium models – notably the Cambridge capital controversy issue mentioned previously, and the non-uniqueness problem implied by the Sonnenschein-Mantel-Debreu (SMD) impossibility theorem (Lavoie 1992, pp 26-40) – is irrelevant. We already know that in a world of uncertainty, general equilibrium does not exist. There is little point concerning ourselves with the internal inconsistencies of a non-existent model, which does not fit the data. This is as 'supersoft' as economics can get.

2.5 The Second Neoclassical Synthesis

Following the failed monetarist experiments of the early 1980s, when, beyond what Lucas and the Real Business Cycle theorists would have predicted, recessions were far more severe, unemployment more persistent and also more severe, and prices apparently more sticky, it was clear to most economists that some concessions had to be made accord to empirical reality. While a 'soft' model is not based on realistic axiomatic foundations, it must at least provide 'explanations' which can be made approximately to fit real world evidence. The core axioms could be defended, only by re-introducing whatever 'frictions' might be required to retro-fit the model to the data.

The majority of the profession had been impressed enough, and perhaps intimidated enough, by the mathematics and imagined logic of real business cycles, that it was widely agreed that the real business cycle model and its approach to micro-foundations had to remain the basis of any acceptable new model. Unfortunately, this restricted the options available to economic theoreticians, and to those basing policy advice on orthodox theory. It consequently did the same to Minsky's prince.

It was no longer acceptable to build a model without rational expectations. Fundamentalist Keynesians and Kaleckians were ignored. Financial Keynesians like Hyman Minsky drifted into further obscurity. It wasn't just that the age of Keynes was past. Even Milton Friedman was by now seen as part of the history of economic thought, rather than a current participant in its on-going development.

The second, or new, neoclassical synthesis, as it became known, might be dated from a paper by Fischer (1977), which brought sticky wages back into respectable economic discourse. There followed many contributions to the New Keynesian economics, which developed into an even broader church than the Neo Keynesian economics of the first neoclassical synthesis. They introduced all the same frictions present in the earlier version, and added some more - for example, the problems of imperfect information and search theory (Diamond 1982), and asymmetric information and the efficiency wage concept (Shapiro & Stiglitz 1984). However, great care was taken to ensure that what were essentially ad hoc additions to the core real business cycle model appeared consistent with rational micro-economic foundations. To do otherwise was considered unacceptable.

> "**To provide theoretical underpinnings, the literature has incorporated the techniques of dynamic general equilibrium theory pioneered in real business cycle analysis. A key point of departure from real business cycle theory is the explicit incorporation of frictions such as nominal price rigidities that are needed to make the framework suitable for evaluation of monetary policy"**
>
> (Clarida, Gali & Gertler, 1999)

Finally, albeit reluctantly, New Keynesians accepted: (1) that in practice central banks set policy interest rates and do not control the money supply - in a sense, a rediscovery of something Wicksell had known long before; and (2) the need to adopt the Taylor rule (Taylor 1993) to re-endogenise exogenous policy interest rates. In doing this, the Dynamic Stochastic General Equilibrium Model was born.

As mentioned at the beginning of the chapter, I have used Woodford (2003); Clarida, Gali and Gertler (1999); and De Grauwe (2010), as major sources on the DSGE model, of which the IMF GIMF model is an extensive version (Kumhof et el. 2010). Before outlining the model, it is important to stress that it is essentially the same model as that advocated by Samuelson and the other economists of the first synthesis, and that it is very similar to the world view of Keynes before the 1930s. What is more, all such models involve the addition of frictions to the Walrasian general equilibrium system as a way of deflecting its obvious lack of realism. It is for this reason that orthodox neoclassical macroeconomics has mostly involved the inappropriate use of a Real Analysis (barter) model to draw conclusions about a real world where its fundamental axioms do not apply.

To deal fully with logical aggregation problems, a DSGE model should ideally have a single 'representative agent'. In order to do anything very interesting with these models, it is necessary to allow the actors within them to differ in some respect from each other. However, this needs to be kept to a minimum. Indeed, if 'agents' are not identical in every respect, it is still necessary to assume they have identical and homothetic preferences, otherwise the non-uniqueness implied by the Sonnenschein-Mantel-Debreu (SMD) impossibility theorem, referred to above, becomes a problem. With non-identical agents, any form of social cost-benefit analysis lacks foundations. Conversely, with fully identical agents, the matter is trivial.

For the purposes of analytical convenience, the representative agent 'lives' for ever, and maximises 'lifetime' expected utility. In each period, utility is a positive function of real consumption, where units are defined in terms of a composite commodity, and a negative function of hours worked. In versions of the model with a monetary asset, real money

balances can be incorporated into the utility function, on the grounds that money conveniently eliminates 'transactions frictions', or money can itself be regarded as a 'friction'. Since so many versions of the model adopt 'Woodford's cashless limit', and omit the monetary asset entirely, I will present likewise.

This gives us the following problem for the representative agent:

$$Max.\, E_0\{\sum_{t=0}^{\infty} \beta^t U(c_t, l_t)\} \qquad (2.1)$$

Subject to the flow budget constraint, $P_t C_t + Q_t B_t \leq B_{t-1} + W_t l_t - T_t$, (2.2)

where β^t is the representative agent's discount factor for t-periods; P_t is the expected period t composite price level; C_t is expected real consumption; B_t is the expected number purchased of one period nominally risk-free discount bonds paying one unit of money at maturity, and available for purchase at a price of Q_t; B_0 is therefore the value of an initial endowment at time 0; W_t is the anticipated nominal wage; l_t is the planned hours of labour supplied; and T_t is the expected value of a lump sum tax.

It is, of course, difficult to see how the 'one unit of money at maturity' can be paid in a model with no monetary asset. Indeed, it can only be paid in the form of real goods.

A 'transversality condition', or solvency constraint, is then added,

$$\lim_{T \to \infty} E_t(B_T) = 0 \qquad (2.3)$$

This virtually rules out bankruptcy within the model, making an endogenously generated financial crisis impossible, and any form of financial crisis very difficult to imagine. Given that the only possible source of nominally risk-free bonds must be a government, the transversality condition also implies a government solvency condition, so that government debt tends towards zero as time tends towards infinity.

This implies that the current value of the government debt must at all times equal the present value of expected future budget surpluses. Where this would be true for all values of the price level, fiscal policy is said to be Ricardian. Where it would not be true for all values of the price level, fiscal policy is non-Ricardian, and then the transversality/solvency condition is met by variations in the price level. This is the *Fiscal Theory of the Price Level* (Woodford 1995).

There is no capital asset in this simplified version of the model, and so there is no capital accumulation. Where such an asset is introduced, it generally involves direct ownership by the representative household, with the asset then rented out to firms.

It should be clear that there is no role for realistic financial markets or in such a model. More generally, no model of Real Analysis can ever be adapted to provide a meaningful explanation of financial instability and financial crisis. Attempts to do so are misguided. You cannot fit Minsky and Keynes into general equilibrium reasoning, though you may tie themselves in logical knots trying to do so.

The most you can do, if you transform household holdings of real assets into financial securities, is introduce modern equilibrium finance theory. This means the efficient markets

theory, portfolio theory (where capital assets are allowed to be differentiated) and standard asset pricing models. Bubbles and crashes require further ad hoc additions to a model based on general equilibrium fundamentals, and essentially make no sense. This is a world of fundamentals, of continuities, and of small exogenous shocks.

One can divide households into those who are potentially liquidity-constrained and impatient ('borrowers'), and those who are less impatient ('lenders'), and then imagine a loanable funds system of financial intermediation, whereby the lenders take a risk and provide finance directly to the borrowers. Finally, to generate a 'financial crisis', one can add an exogenous increase in risk aversion (as in Eggertsson & Krugman 2010). However, it is misleading to imagine that such an approach has anything of value to contribute to the analysis of real world financial crises. All you are doing is playing a logical game within a 'soft' economics model of Real Analysis. There is no scope for a financial crisis that can have a permanent impact on the evolution of output and employment.

> "**it is now standard practice of DSGE-modellers to simulate the consequences of the financial crisis on the economy by introducing an exogenous increase in risk aversion (and thus the risk premium)'"**
>
> (De Grauwe 2010)

In standard DSGE models, as stated above, households are imagined to own fixed capital assets directly and to rent them to firms, with no financial markets, so that household savings decisions determine the rate of capital accumulation in the economy.

The representative agent can then maximise in a dynamic fashion, continuing to base inter-temporal labour supply, consumption, savings and investment decisions on: (1) her own preferences for consumption against leisure; (2) her personal marginal rate of time preference; and (3) the best possible, model consistent, rational expectations forecasts of wages, rents, prices, taxes, and yields, stretching into the infinite future. It leads to something equivalent to the following Euler equation,

$$\frac{u_c(c_t)}{\boldsymbol{E_t} u_c(c_{t+1})} = \frac{\beta(1+r)P_t}{P_{t+1}} \qquad (2.4)$$

where u_c is the marginal utility of an additional unit of real consumption; r is the period t nominal interest rate on the safe bonds; β is the household's real discount factor; and $\frac{P_t}{P_{t+1}}$ is the inverse of the gross expected inflation rate (1+$\boldsymbol{\pi_{t+1}}$). Where the marginal rate of time preference equals the real rate of interest, this reduces to the equalisation of the expected marginal utility of real consumption in every period, which, given constant preferences and interest rates, implies a random walk model of consumption.

With output defined as the sum of consumer spending and pure government spending, if we are to continue to exclude capital accumulation, it also implies the following form of forward looking aggregate demand equation,

$$y_t - yn_t = a_1 E_t(y_{t+1} - yn_{t+1}) + a_2(r_t - E_t\pi_{t+1}) + \varepsilon_t \qquad (2.5)$$

where y_t and yn_t are the logs of current period real output and the natural level of output respectively, such that $(y_t - yn_t)$ measures the 'output gap'; π_t is the current period inflation rate; and ε_t is a random and non-serially correlated shock.

The forward looking representative household bases its current consumption decision on the expected next period output gap, and the current real rate of interest.

This household is imagined to engage in optimal inter-temporal transactions in real physical goods (since bond purchases in a non-monetary model involve exactly this transaction) in order to practice the dynamic optimisation of expected utility across an infinite time horizon.

In the absence of exogenous shocks, this is functionally identical to the time-0 auction in an old fashioned Walrasian equilibrium. The whole of history is organised at time-0. Given complete markets, so that every future contingency can be allowed for at time 0, it is exactly the same. The decisions need only be made once, and then history can be allowed to occur with no further decisions required (Rogers 1989).

It is often implicitly taken for granted that the agent does not value public good provision by the government; is not affected by the welfare of others; and, of course, it is always assumed that labour supply has a marginal disutility ('leisure' always has a strictly positive marginal utility).

These optimising households are, in theory, selling their labour, and renting their capital, to profit maximising firms, where the firms are price takers in the labour and capital markets,

using often homogenous labour and a homogenous capital good to produce output. Production technology is described by a Cobb-Douglas, or other constant elasticity of substitution aggregate production function. Firms do not have a genuinely separate existence from the households who supply them with their resources. There is no divorce of ownership from control in the standard model.

In order to introduce the friction of sticky prices to the model, it is necessary to break with previous versions of general equilibrium models at this stage, by assuming that the product market is characterised by product differentiation and therefore monopolistic competition. This is done purely for analytical convenience, as oligopoly will not fit into the model, and perfect competition does not allow for any variation in pricing decisions between firms.

The standard so-called 'Keynesian' element which is then introduced into the model is a pricing friction, known as the *Calvo pricing rule* (Calvo 1983). Under this rule, a fraction α of firms are not permitted to change their prices in any given period, with the other fraction (*1-α*) free to change price. A higher value for α implies a more sticky overall price level. A zero value means perfect price flexibility, and a return to real business cycles.

The firms which are permitted to change price are determined in the model by a lottery. Some authors have tried to develop an optimising basis for rules of this kind, based on 'menu costs', but it is very difficult to do so convincingly, particularly when authors start to mention the use of lotteries. There is no insight provided in these models towards the role fixed forward prices might play in reality in stabilising cash flows in an uncertain business environment. They

therefore induce blindness to the role played by forward contracts in an uncertain environment.

Profit maximisation by forward looking firms which can only periodically change their prices, given a Calvo restriction, implies an aggregate supply equation as follows:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa(y_t - yn_t) + \eta_t \qquad (2.6)$$

This equation is also known as the New Keynesian Phillips Curve, where β is the discount factor applied to expected future profits; $\boldsymbol{\kappa}$ is a coefficient that depends on the Calvo parameter α, and on the gradient of the marginal cost curve; and finally, $\boldsymbol{\eta_t}$ is a random and non-serially correlated shock.

Given a value for α of 0, and consequently no pricing 'friction', the model reduces to the special case of Real Business Cycles, with κ tending towards ∞ and a zero output gap.

To complete the basic DSGE model, an optimising central bank is introduced, minimising a loss function of the following form:

$$L = (\pi_t - \pi^T)^2 + \psi(y_t - yn)^2 \qquad (2.7)$$

where π^T is the central bank inflation target, and ψ measures the relative emphasis the central bank puts on output stabilisation, compared to hitting the inflation target.

In order for this loss function to be consistent with the micro-foundations of the model, a case has to be made for the representative household to be adversely affected by variances in rate of inflation from some optimal target, and variances in real output from its natural level. The existence of a natural level of output is taken for granted. In addition, some case has to be made for a non-zero inflation target, perhaps based on bias in the official estimates of inflation, or on asymmetric pricing frictions. Alternatively, this central bank loss function can just be assumed as a positive theory of the objectives of modern central banks, rather than as a normative theory of how they ought to behave. There is little doubt that when Bernanke made his 'great moderation' reference, with its emphasis on the volatility of inflation and output gaps, rather than on the levels of unemployment, growth and inflation, he was influenced by this loss function.

The task for the optimising central banker is then a mechanical one of dynamically adjusting the nominal rate of interest, over which the central banker has control, to influence the current output gap, in order to influence the inflation rate. The existence of forward looking households and firms places an emphasis on policy credibility. The output gap in the current period depends on what it is rationally expected to be in the next period: current inflation depends on a rational expectation of its future value.

This problem produces an interest rate setting rule of

$$r_t = (in_t + \pi^T) + c_1(E_t\pi_{t+1} - \pi^T) + c_2(y_t - yn_t) \qquad (2.8)$$

where in_t represents the current value of the natural, real rate of interest, which is determined by the marginal rate of time preference and the marginal productivity of capital, given the natural rate of output.

For plausible values of model parameters, and a loss function where ψ = 1, and assuming a target rate of inflation of 2% and a natural real rate of interest of 2%, this interest-rate setting equation can be re-written as

$$r_t = 0.04 + 1.5(E_t\pi_{t+1} - \pi^T) + 0.5(y_t - yn_t) \quad (2.9)$$

If we assume a time period is a quarter (3 months), and also that a central bank reacts to the inflation rate over the previous four quarters (rather than a rational expectation of future inflation), we get the Taylor Rule (1993).

$$r_t = 0.04 + 1.5(\pi_t - \pi^T) + 0.5(y_t - yn_t) \quad (2.10)$$

In this equation, c_1 > 1 is the 'Taylor principle', which states that nominal interest rates must be increased by more than any increase in the (expected) rate of inflation in order for the policy rule to be consistent with stability, although strictly the condition for stability is more complicated than this. Given the dependence of aggregate demand on real interest rates, and a need to produce a negative output gap to put downward pressure on inflation, the Taylor principle is an obvious feature of the model.

2.6 In My End is My Beginning

It has been a very long journey, but the Taylor Rule and the Wicksell Rule don't look all that different. Both have their roots in general equilibrium real analysis, and just as Keynes proposed a monetary replacement for Wicksellian general equilibrium, so today we require a monetary replacement for DSGE.

It has been possible to make DSGE models and Taylor Rules fit real world data a little better, by making a further series of more or less ad-hoc adjustments. To take account of the fact that central banks normally adopt a gradual approach to changes in interest rates, it is necessary to introduce $\boldsymbol{r_{t-1}}$ onto the right hand side of the interest –rate setting (Taylor) rule

A more serious problem is the lack of any business cycle theory in this New Keynesian model, as it stands. As De Grauwe notes, business cycles imply serially correlated and non-normally distributed output gaps, which are not featured in the above model. (This criticism is reminiscent of Mandelbrot's observation that risky asset returns on financial markets do not share the normally distributed returns implied by efficient markets theory (Mandlebrot and Hudson 2004)).

One New Keynesian response has been to make households 'habit forming', so that there is inertia in the aggregate demand equation; and firms unable to actively adjust prices this period able to at least index to inflation, so as to introduce a backward element into aggregate supply. The first of these represents a reluctant movement from Friedman's (1957) permanent income view of consumption decisions, towards Duesenberry's relative income

theory (Frank 2005), and is questionable in a rational expectations model. The second has no logical basis in the model at all.

A further response is to make the exogenous shocks to aggregate demand and supply in the model subject to serial correlation themselves. This again is surely questionable, as serially correlated 'shocks' cannot fairly be regarded as shocks at all.

Backward looking pricing and consumption, and serially correlated shocks to the model are able to produce serially correlated movements in output within the model, as in real world business cycles. However, De Grauwe points out that simulations based on an amended New Keynesian model still give rise to variations in output which are not significantly non-normal. The DSGE approach does not predict or explain the number of relatively large movements in output gaps which arise in real world economies. This is, of course, not surprising in a general equilibrium system, consisting of optimising decision makers with rational expectations, who are not subject to herding behaviour, or other biases, or cognitive limitations, or fundamental uncertainty.

De Grauwe rightly criticises the evolution of DSGE models as 'unscientific'. They exhibit the characteristics of a degenerative research program, in the sense of Lakatos. A series of non-core amendments and ad-hoc additions to the inviolable core axioms of the model have been made to minimise the gap between historical evidence and the qualities of the model, but without allowing the model to predict or explain vital features of real world economies – most notably, financial crises.

He rejects rational expectations as a basis for forecasting inflation and output gaps, on the basis that it is implausible. Indeed, he compares the notion that a representative household could understand and act on a full knowledge of the structure of the economy to old models of central planning. They both involve a 'top down' view of the economy, with the only difference being that the all-knowing central planner has now been replaced by the even more implausible representative agent with rational expectations.

His suggested amendment to the model, along the lines of Akerlof and Shiller (2009), is to allow for households to use one of a variety of 'heuristics' or rough and ready decision rules, to forecast both inflation and output gaps, where those rules are subject to stochastic adjustment over time, based on their performance. This more plausible approach to expectations formation and decision making at least introduces non-normality into output gaps and inflation. However, it still omits the asymmetry that arises because economic downturns tend to be more sudden and severe, though shorter lived, than economic recoveries. De Grauwe's analysis is a considerable intellectual achievement, and makes a fundamentally New Keynesian model far more consistent with the data. But it still misses the point.

The point is that all general equilibrium models can be traced back to the fable of a barter economy. They all omit fundamental uncertainty, and realistic monetary and financial institutions. They are incapable of describing, even in a stylised way, the realities of a monetary, Wall Street economy. They do not naturally incorporate historical time, path

dependence, hysteresis, persistent involuntary unemployment or modern fiat money. To even begin to deal with reality in a useful manner, we need to substitute some form of Monetary Analysis for the Real Analysis which has always been at the centre of neoclassical economics.

This alternative vision of an economy, as a complex and fundamentally unstable and uncertain system, without any stable equilibrium point but constrained by conventions and institutions, and by the laws of accounting and evolving balance sheets, is much better suited as a guide for understanding the behaviour of capitalist economies and for guiding policy makers.

In Monetary Analysis, money is neither neutral nor exogenous. There is no natural, equilibrium level of output to which the economy would revert over time, given perfectly flexible prices. There is no technological determination of real factor incomes. Production takes time, the financing of production and exchange matters, and the financial system itself is best thought of as a set of inter-connecting and shifting balance sheets, with a tendency towards growing imbalances and financial fragility. The economy is a complex, disequilibrium system, which requires instability thwarting mechanisms if it is to be held close to full employment with a moderate rate of inflation. The distribution of income and wealth reflects bargaining power, institutional structures and social conventions. The rational individualist of neoclassical economics does not exist. How real people make real decisions in an uncertain world matters.

In his *New York Times* blog of June 18th 2013, Paul Krugman quoted Mark Thoma as saying, 'new economic thinking means reading of old books'. My next task is to consider the extent

to which ‘old books’ written by Keynes, the American Post Keynesians Davidson and Minsky, and Kalecki, can help to lay foundations for a new ‘hard’ economics, based on a ‘monetary theory of production’ and the study of ‘man as he is (and woman as she is) and the economic system as it actually exists’.

“‘I believe that the next task is to work out in some detail such a monetary theory of production. That is the task on which I am now occupying myself in some confidence that I am not wasting my time”

(Keynes 1933)

Chapter Three

Post-Keynesian Fundamentals: Escaping Neoclassical Orthodoxy

"The composition of this book has been for the author a long struggle of escape….The difficulty lies, not in the new ideas, but in escaping from the old ones, which ramify, for those brought up as most of us have been, into every corner of our minds".

(**Keynes, writing on 13 December 1935, in his Preface to *The General Theory***)

3.1 A Long Struggle for a 'Hard' Economics

In the previous chapter, I argued that orthodox macroeconomics, and indeed all economics in the tradition of what Schumpeter called Real Analysis, is 'soft' economics. Not only is it grounded on obviously unrealistic axioms, but no valid basis exists for the instrumentalism on which it is based. It has no compelling logical or empirical foundations which justify its use as a prism through which to gain insights about the evolution of monetary economies, or as a means to generate or assess policy proposals.

Using Glimsher's distinction between 'soft' and 'hard' economics, where 'hard' economics seeks to provide a deep explanation of how capitalist economies evolve over historical time, of how people form expectations and make decisions within such economies, and of the role

played by social and institutional factors in influencing those decisions and the path taken by such economies, I argued that 'hard' macroeconomics must be based on Monetary Analysis. Money and finance are at the heart of modern capitalism, and any model with its roots in a non-monetary, non-financial barter economy is an unreliable guide to understanding and managing a capitalist system.

The first serious attempt at a Monetary Analysis of a macroeconomic system was made by Keynes in *The General Theory,* and in his subsequent academic papers. His work was later developed and sometimes improved upon by generations of non-orthodox, or heterodox, economists. The behavioural foundations of his analysis have also been broadly supported by both psychological and increasingly neuroscientific research. I will argue that the logical end-point of Keynes' Monetary Analysis is Modern Monetary Theory, including not only a stock-flow consistent balance sheet approach to understanding how capitalist economies evolve, but also the use of a job guarantee scheme to maintain continuous full employment and to stabilise an unstable economy.

The path from Keynes to Modern Monetary Theory goes through Post Keynesian economics. It is reasonable to describe Keynes himself as a Post-Keynesian, since the various text-book descriptions of Keynesian economics since Samuelson misrepresent Keynes' ideas as Real Analysis with frictions, and to describe much of Post-Keynesian economics as being a logical development out of fundamentalist Keynesian ideas.

The classification of economists, and of their models, ideas and methodologies, into named schools of thought, is subjective and contentious, and yet for some purposes essential. For

example, it is common to describe all orthodox economics since the marginalist equilibrium revolution of the late nineteenth century as 'neoclassical', and that before it as 'classical'. Keynes did not distinguish between a neoclassical school and classical economics, in spite of their differences, since most classical economists and all neoclassical economists accept some form of Say's Law, or full employment equilibrium, or natural rate hypothesis, at least in the long run. Many non-orthodox economists who followed Keynes regretted his approach, since classical economists had interests in income distribution, growth and development, and the psychology of decision making which the neoclassical revolution largely swept away.

Even the use of terms like 'orthodox' or 'mainstream' economists to refer to the dominant neoclassical school is problematic. There have always been dissenters within that school, and in recent years these dissenters have included the more progressive New Keynesians such as Stiglitz and Krugman. They have little in common for practical policy purposes with Real Business Cycle theorists such as Prescott and Lucas, but have also been shown to differ radically from conservative New Keynesians such as Taylor and Mankiw, especially since 2008. I don't wish to discuss these differences here, but instead want to emphasize that they are all correctly classified as 'orthodox' or 'neoclassical', due to their continued use of a model with long run 'natural' equilibrium positions.

Given that Post Keynesians are those who have maintained and developed the research tradition founded by Keynes, and have laid much of the foundations for Modern Monetary Theory, it is important to clarify the shared pre-occupations and axioms which define this non-orthodox school of thought. This is not an easy task, however. Post Keynesian economics can variously be described as having started with Keynes (although some give Kalecki priority) and

his colleagues in the 1930s; to have evolved out of theoretical disputes between the students of Keynes and their students and leading orthodox or neoclassical economists in the 1950s and 60s; or to have begun with the development of a Post Keynesian monetary macro-economics, notably by Paul Davidson and Hyman Minsky, in the 1960s and especially the 1970s.

3.2 Keynes and Post-Keynesian Economics

An important paper was published by Alfred Eichner and Jan Kregel in the Journal of Economic Literature in 1975, entitled 'An Essay on Post-Keynesian Theory: A New Paradigm in Economics'. There are many references in that paper to the work of the first generation of Keynes' followers, especially Harrod, Kaldor and Robinson, as well as to the great Michal Kalecki. There are also references to the main contributions which had been made at that time by Paul Davidson and Hyman Minsky.

Eichner and Kregel (1975) identify the following distinguishing characteristics of what they call post-Keynesian theory:

- It 'retains the fundamental approach to a monetized production economy outlined by Keynes' , which is an economy driven by effective demand, with no natural tendency towards full employment.

- It is 'rooted in a dynamic process' in historical time, which is a potentially unstable and uncertain disequilibrium process.

- It is concerned with the distribution of income as 'integral to the explanation of economic activity', and not determined by technological factors.

I have changed the order in which these characteristics were listed, and have also reinterpreted them, to be consistent with the view that Davidson's explanation of uncertainty and liquidity preference theory, and Minsky's financial instability hypothesis, provide the best succinct descriptions of the first two of these characteristics; and Kalecki's analysis of income distribution and the degree of monopoly the most enlightening treatment of the third.

This is a contentious point of view. Post Keynesians have been split into sometimes competing factions. At one stage, Davidson (1972, pp 2-3) referred to other leading (Kaleckian) Post-Keynesians with whom he had disputes, including Robinson, Kaldor and Pasinetti, as Neo-Keynesians, which is now a term used for those orthodox economists of the first neoclassical synthesis. Davidson placed himself in 'Keynes's School' (alongside Harrod, Lerner and Weintraub), and identified a 'Socialist-Radical School', stretching from J.K. Galbraith to Marxists, who 'do not claim any legitimate descent from Keynes', which might have been news to Galbraith. Minsky preferred to describe himself as a Financial Keynesian.

In spite of all the personalities, and divisive debates over theoretical points of little real world significance, it is an essentially Post Keynesian, stock flow consistent, modern monetary

theory approach to the economy, that is the best tool for 'hard' Monetary Analysis available today. It is not a form of Monetary Analysis which Davidson consistently adopts, or that is to be found, fully developed, in Minsky or Kalecki. Nonetheless, they have all contributed towards its development. Before we can move on towards Godley and Lavoie's stock-flow consistent models, or the modern monetary theory of Mitchell and Wray, it is wise to consider the foundations provided by Davidson, Minsky, Kalecki, and of course Keynes.

A superficial reading of *The General Theory*, particularly one which omits or misinterprets chapter 12 ('The State of Long Term Expectation') and the more difficult, but fundamental, chapter 17 ('The Essential Properties of Interest and Money'), can lead to a fundamental misunderstanding of Keynes' economic model (using the term in this case to describe Keynes' mature view on the evolution of a monetary economy over time). This should be obvious to anyone who has read four subsequent papers of Keynes, three of which were in the *Economic Journal* – 'Alternative Theories of the Rate of Interest' (1937b); 'The "Ex-Ante" Theory of the Rate of Interest" (1937c); and "Relative Movements of Real Wages and Output" (1939). The remaining paper in this quartet is 'The General Theory of Employment' (1937a), published in the *Quarterly Journal of Economics*.

The common misunderstanding of Keynes has been attributed to the following factors, of which, Keynes was well aware:

- The tendency of orthodox economists in every age to see the economy as a stable general equilibrium system, met with random disturbances and kept temporarily away from its equilibrium state by 'frictions' (such as the infamous 'sticky wages').

- Keynes' intention of writing in a persuasive and coalition building manner for his fellow academic economists, which led him more than once to deliberately downplay the differences between his 'general theory' and what he regarded as the 'special theory' of what he called 'classical economics'.

- Keynes' long history of learning, teaching, and practising what he called 'classical economics'.

- Keynes' intention, as explained by Davidson, to retain the axiomatic-logical basis of orthodox economics, but to relax key axioms within the neoclassical orthodoxy to produce a more general theory. James Galbraith (1994) has suggested that the term 'General Theory' was deliberately borrowed by Keynes from Einstein.

- The omission of the 'technical monetary detail' of the *Treatise on Money* (1930), which is left 'in the background' in *The General Theory* (Rogers & Rymes 1997, p313), and Keynes's support for what Bindseil (2004) refers to as 'reserve position doctrine' as opposed to the 'short term interest rate doctrine' as a more useful description of the normal operational target of central banks. This may have played some role in Keynes's apparently strident scepticism concerning Lerner's advocacy of outright monetary financing in the context of functional finance (Lerner 1943), although Keynes views on functional finance appear from his correspondence to have been supportive of the logic, but scepticism of the practicality of explaining the ideas to fellow economists or the wider public (Colander 1984).

- The fact that Keynes in Chapter 2 of *The General Theory* explicitly identified only two fundamental postulates of classical economics – namely 'I. The wage is equal to the marginal product of labour' and 'II. The utility of the wage when a given volume of labour is employed is equal to the marginal disutility of that amount of employment' - and then proposed to accept the first of these propositions, while rejecting only the second.

The first postulate implied an acceptance of profit maximisation, perfect competition and diminishing returns to scale. Keynes (1939) subsequently accepted that this postulate was possibly inconsistent with real world evidence, encouraged to do so by Tarshis (1939) and Dunlop (1938). However, this perhaps misses the point. Davidson has argued that Keynes was demonstrating that Say's Law could be rejected in a monetary production economy without going further than taking money and uncertainty seriously, and Keynes' own comments in response to Tarshis and Dunlop support this interpretation.

The rejection of the second postulate taken in isolation suggested that involuntary unemployment might be the result of those 'frictions' of which pre-Keynesians (such as Pigou) were already well aware – most notably, the downward inflexibility of money wage rates.

This has proved to be most unfortunate. It has contributed towards eighty years of various brands of what Robinson famously referred to as 'bastard Keynesians' (the largely orthodox Neo-Keynesian real analysts of the first neoclassical synthesis, and the robustly orthodox

New-Keynesian general equilibrium theorists of the second), for whom the terms 'special' and 'general' as used by Keynes must be reversed.

For a New Keynesian, Keynesian economics is the 'special theory' of depressions, or of what Krugman and Woodford would call the 'zero bound' for interest rates, and general equilibrium is seen as the general theory for the long run and for natural rate equilibrium positions.

All of this is the result of a misreading of *The General Theory*. In it, Keynes argues that money wages are inflexible downwards, but that even if this were not the case, real wages would be inflexible downwards in an environment of falling wages and prices. However, Keynes also clearly states that inflexible wages are not the cause of persistent underemployment in his model. The cause, for him, is the natural operations of an uncertain entrepreneurial monetary economy, and its failure to provide consistently a full employment level of effective demand for labour.

In The General Theory, there is an inverse relationship between employment and the real wage, for the reasons Tarshis and Dunlop identified, but the real wage itself is set in the product market, and is dependent on expected sales and employment decisions by employers. Workers are not in a position to change the real wage by accepting a change in their money wage rates. In Kalecki's more realistic analysis, the real wage depends on the degree of monopoly, and a fall in the real wage, due to its impact on the distribution of income, decreases output and employment, unless it is offset by a positive change in the trade balance, government deficit, investment spending, consumption out of capital income.

Keynes explains that falling wages and prices would in an economy with debt contracts denominated in money terms, trigger a debt deflation (as described by Fisher (1933) and later in various works by Minsky), which would decrease effective demand, and have an adverse effect on 'animal spirits', the marginal efficiency of capital (or the demand price for new capital goods) and business investment.

Keynes discusses and dismisses both the Pigou effect (where falling prices are supposed to increase the real value of financial wealth denominated in nominal terms) and what became known after his death as the Keynes effect (where a falling price level is supposed to increase the real value of an exogenously given money supply and reduce some equilibrium rate of interest). An understanding of balance sheets and of the endogeneity of money and exogeneity of policy interest rates in a modern economy leads us to be even more dismissive of these effects. Even within a macro model with otherwise neoclassical characteristics, the presence of a Fisher effect which is stronger than the Pigou and 'Keynes' effects is enough to make wage and price flexibility destabilising rather than a force driving the system back to general equilibrium (Palley 1996).

Keynes explicitly states that the failure of Say's Law to be relevant to a monetary economy is not related to wage/price rigidity or to any other of the supposed 'frictions' identified in his day or subsequently by 'bastard Keynesians'.

> **"the wage unit might have to fall without limit" (Keynes 1936, p.253)**

> **"There is, therefore, no ground for the belief that a flexible wage policy is capable of maintaining a state of continuous full employment" (Keynes, 1936, p267)**

3.3 Paul Davidson, Uncertainty and Liquidity Preference

A proper understanding of Keynes' theoretical revolution involves a thorough reading of not only *The General Theory*, but also his writings in the years before and (especially) the papers written after its publication. Paul Davidson has spent a long and sometimes controversial professional life, explaining and interpreting Keynes, attempting to update Keynes' ideas, and applying his generally persuasive interpretation of the Keynesian 'general theory' to modern economic problems.

He has provided us with a clear and logical description of the 'classical' axioms that Keynes sought to overthrow in moving from the 'special' (real analysis) full employment theory of classical economics to a more 'general' (monetary analysis) theory of employment, interest and money. These axioms have been stated by Davidson many times in numerous papers and texts.

Davidson (2007, p27) reminds us of the dictionary definition of an axiom as 'a statement universally accepted as true...a statement that needs no proof because the truth is obvious'.

The three 'classical axioms', maintained, according to Davidson, in all orthodox economics, at least in the long run, are 'the neutral money axiom', 'the gross substitution axiom', and 'the ergodic axiom'.

The '*neutral money axiom'* is just another name for the 'market clearing axiom' or Say's Law. If economies always revert to a full employment equilibrium given by technology and preferences and given independently of demand and of money and finance, then money will be neutral (at least in the long run). This is the world of orthodox real analysis.

The '*gross substitution axiom'* states that all commodities (including money and labour as commodities) are substitutes for each other, so that changes in relative prices (including the price of money, where money is a commodity, rather than a financial instrument) can allow the economy to react to shocks (such as an increase in the demand for commodity money) to restore the economy to full employment and to ensure Say's Law and money neutrality apply. Once again, this is real analysis.

The '*ergodic axiom'* relates to Davidson's interpretation of Keynes's mature views on the central and subtle issue of expectations, risk and uncertainty. The *'ergodic axiom'* as applied in economics states that the probability distributions of future relevant economic variables can be known based on currently available and historical information. As Davidson puts it, it implies that the future can be described as a random sample drawn from the past. Decision makers can possess actuarial certainty when making forecasts of future economic variables of interest. 'The future is merely a statistical reflection of the past'. (Davidson 1994 p90).

Without the ergodic axiom, there will be a precautionary demand for money as a perfectly liquid and nominally safe financial asset and form of insurance against an unforeseeable future. There may, as a result, be no change in relative prices which can cause those holding

money to exchange it for goods and services. Consequently, Say's Law will not apply, and there is the potential for persistent unemployment due to a lack of effective demand.

The ergodic axiom, the gross substitution axiom and the neutral money axiom do not hold in an entrepreneurial monetary economy. Full employment is not assured and an approximation to full employment is at best a special and temporary case. There is no market process whereby a general equilibrium can be achieved. Orthodox economics (real analysis) is the *special theory,* with more restrictive axioms: it is the economics of Keynes (monetary analysis) which is the more *general theory,* where these axioms are abandoned.

Keynes has many times been described as the first economist to take the role of expectations in decision making seriously. In Chapter Five of *The General Theory*, Keynes distinguished between the short run expectations of business that determine current output and employment levels, which are relatively stable over time, and heavily influenced by recent realised sales; and the long run expectations of business and portfolio investors, that determine capital investment decisions and speculative asset valuations, and which are subject to a much higher degree of uncertainty and 'liable to sudden revision'.

Nevertheless, the economist who is usually given credit for the distinction between quantifiable risk and uncertainty is Frank Knight (1921). For Knight, expectations can be based on risk when outcome probabilities are known or can feasibly be estimated, but are uncertain either when the range of possible outcomes is unknown or when it is not feasible to estimate the probability of each possible outcome.

Davidson makes a distinction on this basis between Knightian or epistemological uncertainty, and Keynesian or ontological uncertainty.

Knightian uncertainty is uncertainty born of limited information-processing power or an increasing marginal cost of information. Where the outcomes of a decision cannot be described as having computable or estimable probabilities, this does not mean that there is an indeterminacy in the laws that govern the universe. Objective probabilities exist, but they are beyond the capacity of any individual to know. Uncertainty is due to a limitation on what can be known and not due to probability distributions for future events failing to exist.

Keynesian uncertainty, according to Davidson and Shackle (1961), can be regarded as being of a more fundamental kind, and associated with Keynes' discussion of long run expectations – both in Chapter Twelve of *The General Theory* and in his 1937 paper in the *Quarterly Journal of Economics* – though it can also be found, in his early and deeply philosophical 'Treatise on Probability' (1921).

It is worth quoting extensively from a very well-known passage in a paper he published in 1937 in *The Quarterly Journal of Economics* -

> **"By 'uncertain' knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty; nor is the prospect of a Victory bond being drawn. Or, again, the expectation of life is only slightly uncertain. Even the weather is only moderately uncertain. The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the**

rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth-owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know."

(Keynes 1937a, p213-5, for the whole passage)

This is very much consistent with a non-ergodic definition of Keynesian uncertainty, as suggested by Davidson. The passage is in the context of long term assessments of the return on investment and the accumulation of wealth. "Thus the fact that our knowledge of the future is fluctuating, vague and uncertain, renders Wealth a peculiarly unsuitable subject for the methods of the classical economic theory" (p213).

When assessing the returns on a long lived capital investment project, there may be no basis for formation of reasonable probability distributions of projected cash flows and rates of return. 'Nevertheless, the necessity for action and for decision compels us as practical men to do our best to overlook this awkward fact and to behave exactly as we should if we had behind us a good Benthamite calculation of a series of prospective advantages and disadvantages, each multiplied by its appropriate probability, waiting to be summed'(p214).

If we want to 'behave in a manner which saves our faces as rational, economic men' (p214), our only option is to use some kind of heuristic, such as assuming 'that the present is a much more serviceable guide to the future' than is likely to be the case; that 'the existing state of opinion as expressed in prices and the character of existing output is based on a correct summing up of future prospects', which means behaving as though markets are

informationally efficient, when there can be no basis for this assumption; or that we can 'fall back on the judgment of the rest of the world which is perhaps better informed' and behave according to the conventions of the moment.

> **"Now a practical theory of the future based on these three principles has certain marked characteristics. In particular, being based on so flimsy a foundation, it is subject to sudden and violent changes. The practice of calmness and immobility, of certainty and security, suddenly breaks down. New fears and hopes will, without warning, take charge of human conduct. The forces of disillusion may suddenly impose a new conventional basis of valuation. All these pretty, polite techniques, made for a well-panelled Board Room and a nicely regulated market, are liable to collapse."**
>
> (Keynes, pp214-5)

This is one of the most important passages in the history of economic thought, and strangely ignored by orthodox neoclassical synthesis Keynesians. Keynes identifies a critical weakness in orthodox thought – its treatment of uncertainty and long run expectations. He defines uncertainty in this case in an ontological sense – as concerned with matters where *'there is no scientific basis on which to form any calculable probability whatsoever. We simply do not know'.'*

Keynes also outlines a conventional approach to expectations formation, which allows us to 'save our faces as rational, economic' decision makers. He deals with both uncertainty and rationality in the same passage. When the future is uncertain, rationality cannot be based on a quantitative assessment of objective expected values and risks: a form of rationality, based

on conventions which provide only a 'flimsy foundation' for our expectations and are subject to 'sudden and violent changes' is all we have available to us.

There has been, and continues to be, as much confusion regarding what it means to be rational, as there is regarding the significance of the distinction between risk and uncertainty. Conventional behaviour is regarded as a form of 'procedural rationality' by Simon (1986), but is occasionally referred to as irrational behaviour by other psychologists and economists. For example, Ariely's book entitled 'Predictable Irrationality' (2008) is mainly concerned with forms of conventional and heuristic behaviour. This terminological confusion is unfortunate, as it has led many economists to distinguish in my view misleadingly between substantive rationality (based on rational expectations), procedural rationality (based on conventional behaviour in a complex and uncertain world), and irrational behaviour (which by implication is chaotic). These terminological confusions (or, if not confusions, examples of hair splitting) prevent the bridges being built which ought to permit the construction of a more useful economics.

Keynes's conventional behaviour, Simon's procedural rationality, and Ariely's irrational behaviour are virtually identical. In each case, we have reasons for behaving in the ways in which we do; we do not make entirely random and fully irrational decisions (of course we don't); and we are constrained by the limitations of the human brain, the complexity and cost of the available and potentially relevant information we are surrounded with when making decisions (especially those with potentially long term and irreversible consequences), and the fact that the relevant information may simply not exist. This leads to us making decisions

which an external observer with more information or with the benefit of hindsight might regard as 'irrational', but which we have a reasonable basis for taking.

It is the non-existence of information regarding a potential future which Davidson has referred to as non-ergodicity, which Shackle discussed at length and over many years, and which Keynes, at least some of the time, adopts as his definition of fundamental uncertainty, thereby rejecting the 'ergodic axiom'.

The term 'ergodic axiom' is borrowed by Davidson from the Moscow mathematical school of probability, and a term of which Keynes himself would not have been aware. However, there is no doubt that non-ergodicity is an appropriate description of the fundamental uncertainty described by Keynes in the above passage.

An ergodic system is one governed by probability distributions which in principle are available to be discovered. Even if the cost or complexity of gathering the necessary information to estimate these probabilities is prohibitive, or beyond our cognitive capacities, so that the situation is uncertain in an epistemological sense (in terms of what can be known), the environment would be described as ergodic.

In a non-ergodic system, probabilities of future outcomes are unknowable because they do not and cannot exist. They remain to be created. Non-ergodic systems are governed by processes which are uncertain not due to human cognitive limitations and/or research costs, but in a more fundamental way – because the current crucial and irreversible decisions of actors in what is a complex network characterised by what Soros (2009) has called 'reflexity'

(we do not make decisions in a stable environment, but instead we create that environment by our decisions and actions). This is uncertainty in an ontological sense (in terms of what exists).

Davidson has often compared the non-ergodic environment of Keynes with the approach to modelling expectations taken by Lucas and all those building models based on rational expectations. For Davidson, rational expectations models assume objective probabilities which can be assessed based on the relative frequencies with which states of nature occur in a stationary environment. In rational expectations models, agents behave as though they are aware of how the economy functions (it functions the way the modeller has postulated), and they never make even theoretically predictable errors. All available information which has relevance to forecasts of future values of economic variables is taken into account when agents form their expectations of those future values. Agents, it is assumed, do not use heuristics or conventions – they optimise. This is, of course, built into orthodox dynamic stochastic general equilibrium models.

Davidson, Shackle, Soros and Keynes argue that there is insufficient 'available information' to allow for anyone to optimise in this way, where decisions with long term consequences are concerned , and in highly volatile environment, such as a financial crisis, even for short term decisions. What are the expected returns and risks of this long term capital investment decision? We simple do not know. We are making decisions between an unchangeable past and an unknowable future (as has been stressed by many Post Keynesians). We don't know the circumstances that will arise, and as Hicks put it in his *'Causality in Economics',* 'people know that they just don't know' (Hicks, 1979). By the late 1970s, Hicks the co-founder of the

neoclassical synthesis had become Hicks the Post-Keynesian – far closer to Davidson and Shackle in his views than to Samuelson and Tobin.

This means, as Davidson and many others have argued, that rational expectations are either infeasible or have to be interpreted in such a way as to be tautological and essentially meaningless. In a similar context, and obviously, many years before the formal definition of rational expectations by Muth, in his Treatise on Probability, Keynes referred to the 'pseudo-rationalistic notions' of the 'extraordinary contraption of the Benthamite School' (Lawson 1985).

Keynesian rationality is the procedural or bounded rationality of Simon and of many other behavioural economists, conforming to any reasonable notion of what it means to be rational in a complex and uncertain world.

> **"We should not conclude from this that everything depends on waves of irrational psychology. On the contrary, the state of long-term expectation is often steady, and, even when it is not, the other factors exert their compensating effects. We are merely reminding ourselves that human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for such calculations does not exist; and that it is our innate urge to activity which makes the world go around, our rational selves choosing between alternatives as best we are able, calculating when we can, but often falling back for our motive on whim or sentiment or chance."**
>
> (Keynes 1936, pp 162-3)

For Taleb (2007), the existence of uncertainty is enough to undermine the methodology of orthodox economics – its source, whether epistemological or ontological, is irrelevant. Mostly, when Taleb discusses black swans, he is discussing unknowns due to an unavoidable ignorance of relevant information, and not due to its non-existence. He is discussing Knightian uncertainty, but unlike Davidson, he does not see the distinction as important. The same is true of complexity theorists, where simple rules interact to create non-linearities and unpredictable outcomes, and of psychologists, when discussing our cognitive limitations and the operation of intuitive thinking.

There is some truth in this view. One qualification to this, and a reason to accept as significant Davidson's description of Keynesian uncertainty, is the position of the Austrian School. Austrians are well known for their analysis of markets as co-ordination mechanisms – summarising in prices information regarding the fundamental values of traded commodities which are not known to any individual trader within the market. This 'wisdom of crowds' argument is based on a vision of individual decision makers as bounded by epistemological uncertainty regarding value, which their interaction in the market overcomes.

It holds out the prospect of efficient markets without well informed individual traders or individual institutions. Since the government is such an institution, it implies a minimal role for government and a maximal one for lightly regulated or unregulated markets. It takes the uncertainty, which to Keynes undermined the logic of Say's law and general equilibrium, and uses it to construct an alternative rationale for laissez faire. In practical terms, there is little between the recommendations of the heterodox Austrian School and those of orthodox Real

Business Cycle theorists, despite their apparently polar opposite assumptions about the availability of information to individual decision makers.

In one sense, the Austrians are of course right – markets play an essential co-ordinating role. However, the work of behavioural economists leads us to suggest that even the concept of absolute value in efficient market theory is lacking in empirical support. Instead, our concept of value tends to be based on some form of arbitrary coherence and is highly reference-dependent, as Ariely, Loewenstein and Prelec (2003) have shown. Moreover, complexity economics reminds us that humans interact and influence each other in a variety of ways, and not only via trades at market prices (Ormerod 1998, Kirman 2011). The wisdom of crowds requires us all as isolated individuals to possess small pieces of relevant information which can be co-ordinated by market processes. In a complex social system, where decision makers do not make independent assessments of value, but are subject to a variety of social influences and framing effects, the argument collapses, and something closer to Keynesian uncertainty is restored.

For orthodox economists old and new, like Ramsey (1931), Savage (1954) and Sargent (1993), the distinction is not between risk and uncertainty, but between objective risk, when probabilities can be known, (for example via repeatable experiments in a stationary environment), and subjective risk, when it is possible for decision makers to construct scenarios regarding possible future outcomes and to apply subjective assessments of relative likelihood summing to unity to those outcomes. Savage (1954) extended expected utility theory to incorporate subjective probabilities. A proper discussion of expected utility theory is postponed until the next chapter.

Subjective expected utility theory is at the root of modern financial economics, including portfolio theory, the efficient markets hypothesis, and asset pricing models, and is of course built into the dynamic stochastic general equilibrium model. For those orthodox economists who advocate a reliance on such models, a Darwinian and Bayesian process ensures that decision makers whose subjective probability estimates are the most accurate over time will be the most successful, and will come to dominate financial and other markets.

Lucas, of course, does not genuinely believe we always make decisions pertaining to outcomes with known objective or stable subjective probabilities.

"mainstream theory axioms are 'artificial, abstract, patently unreal'."

(Lucas 1981, p276, quoted by Davidson 2012)

However, his rational expectations revolution was based on models with objective risk. These models consist of decision makers who make efficient use of all the available and relevant information to forecast variables of relevance to their optimal decisions. This information generally includes the structure of the economic model within which they live and the distributional parameters of any stochastic variables within that model. Stochastic variables generally follow normal distributions, with known means and standard deviations. As Davidson would say, in the absence of genuine shocks from outside the model (often in the form of destabilising government policies), decision makers in these models are supposed to have perfect actuarial knowledge of the future economic environment. Shackle defined

decisions in such a concept as ‘empty’ (Shackle 1961), in the sense that there is no decision at all – known preferences and perfect actuarial knowledge means only one option can ever be taken.

Such circumstances would only be even technically feasible when probability distributions were highly stationary over time – when the past can be interpreted as a sample taken from the future so that relative frequencies drawn from the past can provide objective probabilities to be applied in the future.

Even Paul Samuelson, who used the term F-twist (Samuelson 1963, p232) to mock Friedman’s approach to ‘positive economics’ (Friedman 1953), accepted the notion of subjective probabilities and the ‘ergodic axiom’ (Samuelson 1969). He saw it as essential to the application of the scientific method in economics, as has been reported many times by Davidson (including in 2012), and was one of those who devised the efficient markets theory of financial markets. All orthodox neoclassical synthesis Keynesians (both the old variety, who did not assume rational expectations, and the new variety, who accept it as essential to ‘sound micro-foundations’) have ignored what Keynes had to say on uncertainty.

The efficient markets theory still dominates the text books, but it is not supported by the bulk of the evidence – either in financial markets or the markets for goods and services. With a few exceptions, goods prices do not clear markets anyway and are administered by price setting firms seeking satisfactory outcomes. The role of the price system is to determine the distribution of income and not to reflect fundamental value. Prices do clear financial markets,

but, since at least Shiller (1981), the evidence against the efficient market hypothesis and in favour of a psychological theory of asset pricing has grown more and more convincing.

An understanding of expectations formation and of the link between expectations and decision making by firms and households, is central to understanding the evolution of investment decisions, employment, output, asset prices and private balance sheets over time. It is a crucial point of difference between orthodox (including New Keynesian) economists and Post Keynesian economists (including, of course, Keynes).

An understanding of the nature of uncertainty is a starting point for understanding following:

- the importance of liquidity and the special role of money in a capitalist economy;
- the reasons why money and finance can never be neutral;
- the causes of path dependence (or hysteresis or cumulative causation) in real economies; the inadequacy of the efficient markets hypothesis as compared to a liquidity preference theory as an explanation of the behaviour of financial markets over time;
- the volatility of investment spending;
- the operation of the economy as a complex social system;
- and the tendency of the economy towards instability and disequilibrium at it evolves over time, as described by Minsky.

"To understand Keynes it is necessary to understand his sophisticated view about uncertainty, and the importance of uncertainty in the economic process. Keynes without uncertainty is something like Hamlet without the Prince."

(Minsky 1975 p 55)

Davidson occasionally goes beyond Keynes in his description of non-ergodic, fundamentally ontological uncertainty, and this is increasingly true of Davidson's later writing on the subject. Keynes, perhaps it is fair to say, had a more eclectic and sophisticated understanding of uncertainty than Davidson. Harrod wrote a fascinating 'Note on "Treatise on Probability"' as an appendix to his 'Life' (1966, p 651-656), outlining the influences of philosophers like Hume, Moore and Russell on Keynes' views on probability. Keynes did not reject the notion of probability, but did reject as useful the notion of objective probability as outlined by the relative frequency school who founded probability theory.

Keynes did not view probability as a description of the relative likelihood of an event, but rather as a representation of the evidence for a proposition. '*Keynes insists that this expression may have values lying between certainty and impossibility that are incapable of precise numerical expression'* (Harrod 1966, p 654). For Keynes, it is not only the subjective probability relating to a proposition which is of importance for decision making, but also the degree of belief or confidence in that subjective probability. In orthodox economics, there is no distinction between probability and degree of belief: for Keynes (1921), they are separate concepts. Where beliefs regarding subjective probabilities are not held with confidence and are subject to revision in the light of surprising new evidence, then the degree of belief a decision maker has in their existing subjective assessments of the probabilities is of importance for understanding the way they make decisions. The weight with which the

evidence for a subjective probability is held is a separate concept to that of estimated probability itself, and both concepts influence the decision weight applied to the associated outcome by the decision maker. This is related to uncertainty or ambiguity aversion, and the Ellsberg Paradox (Ellsberg 1961), to which I will return in the next chapter.

New evidence might reduce a subjective probability, but can increase the weighting we give to a proposition in forming our expectations of the future, because we become more confident that our expectations have some validity.

So Keynesian uncertainty is often ontological, but can be epistemological and even consistent with subjective quantifiable beliefs. The degree of confidence in those beliefs is then of vital significance. It is of interest that modern psychological research relating to risk and uncertainty provides evidence in favour of Keynes' sophisticated approach. This will be discussed in my next chapter.

Even so, the Keynesian analysis of uncertainty and the consequences of uncertainty has been progressively and all but completely airbrushed out of orthodox economics since 1945. This has occurred to such an extent by now that many text books and courses at leading universities with titles such as 'decision making under conditions of risk and uncertainty' make no distinction between the two circumstances, and even leading economists use the terms 'risk' and 'uncertainty' interchangeably.

The following footnote appears on page 373 of the second edition of 'Money and the Real World' (Davidson 1978). It is an excerpt from a letter written by Kenneth Arrow to Paul Davidson.

> **"I am not convinced that the distinction between uncertainty and risk is really vital...The problem in all this is to create something which is genuine theory, that is, a well-articulated framework with implications. It is interesting that the parts of Keynesian theory that became popular were, as you suggest, a retrogression from Keynes' deeper insights; but this is no accident. One part of the theory was in fact capable of development even though it was an impoverished version of the whole; the other part, deeper though it was, could not in fact be developed."**
>
> (Arrow, quoted in Davidson 1978, p 373)

This statement from one of the fathers of the modern orthodox general equilibrium analysis, which provides the microeconomic foundations of the New Keynesian model on which policy decisions have been based for many years, explains the neglect of Keynes's analysis of uncertainty and Keynes' writings on the psychology of decision making within the orthodoxy. They were neglected because they did not fit into their analytical model. At least Arrow had some awareness of this, although his view that it is an insignificant omission is profoundly mistaken.

It is an omission of which orthodox neoclassical synthesis Keynesians have always been guilty. This omission has encouraged them to accept the long run validity of the orthodox axioms that Davidson has argued Keynes was seeking to reject. Among other errors, this has led to the interpretation of liquidity preference theory as a narrow theory of the demand for money, rather than as a broad theory of a psychological theory of financial markets, and the

incorporation of that narrow theory into the ISLM model, which was itself at the heart of the first neoclassical synthesis, and the incorporation of 'bastard Keynesianism' into the frame of orthodox economics.

Both Davidson and Minsky understood Keynes's liquidity preference theory as a psychological theory of the demand for money and other liquid financial assets under conditions of uncertainty, and as the basis of an alternative and more realistic description of the role of non-neutral money and finance in a monetary economy than the efficient markets theory which naturally evolved out of orthodoxy.

Keynes (1936) supplied us with the following foundations for a theory of money and finance:

- The statement that *'the importance of money essentially flows from its being a link between the present and the future'* (p293) - a time machine for our purchasing power. Keynes stressed an understanding of the role of money as a fully liquid store of value as essential to an understanding of the operation of a monetary economy.

- An equation for '*the total return expected from the ownership of an asset over a period' (p226), which in its full form was (q+a-c+l)*

q = income yield (which can be implicit, such as the flow of services from a house or other durable good, or explicit, as in dividends from a stock)

a = anticipated capital gain

c = carrying cost (which can be defined to include depreciation, where real assets are concerned)

l = liquidity premium

In *The General Theory*, money is non-interest bearing; it cannot generate a capital gain (in terms of itself); and it has no significant carrying cost. The only yield available from holding non-interest bearing money is its liquidity premium (l).

This is not to say that Keynes was specifying that money had to be defined in this way. In a footnote on page 167, he argues that 'we can draw the line between 'money' and 'debts' at whatever point is most convenient for handling a particular problem'. However, in 'The General Theory' money has perfect liquidity, but no income yield, capital gain, or carrying cost (other than inflation). It is 'co-extensive with (non-interest bearing and sight) bank deposits'.

- A statement of the following two 'essential properties of money'.

(1*) 'money has, both in the long and in the short period, a zero, or at any rate a very small, elasticity of production, so far as the power of private enterprise is concerned, as distinct from the monetary authority....money cannot be readily produced by labour*' (p230)

(2) 'it has an elasticity of substitution equal, or nearly equal, to zero...money is a bottomless sink for purchasing power' (p231)

It is important not to misunderstand these statements. They do not imply that the banking system cannot facilitate an increase in the supply of money to match an increase in demand. They instead imply that an increase in liquidity preference during a financial crisis, and a consequent shortage of credit and of effective demand, cannot be alleviated by the physical production of money (as though money was a commodity or a good which could be produced by workers in factories, rather than a financial liability). Moreover, that under these circumstances there is no feasible change in the money prices of goods and services or the price of labour which can restore full employment. Orthodox New-Keynesians implicitly reject this statement by Keynes when they adopt natural rate reasoning, which is of course just a long run form of Say's Law.

The only institution with the power to curtail a deep recession when people insist on sinking their wealth into this bottomless pit, is the monetary authority (or monetary sovereign government, incorporating the central bank).

- The following short statement from the paper in the Quarterly Journal of Economics -

'different types of assets satisfy the desire for liquidity in different degree.' (Keynes 1937a)

This 'admission' paper reminds us that liquidity preference theory is a theory of finance generally, and a behavioural rather than an efficient markets theory, and not just a theory of the demand for money.

- This longer extract from the same paper:

> **"Why should anyone outside a lunatic asylum wish to use money as a store of wealth? Because, partly on reasonable and partly on instinctive grounds, our desire to hold *Money as a store of wealth is a barometer of the degree of our distrust of our own calculations and conventions concerning the future*. Even though this feeling about Money is itself conventional or instinctive, it operates, so to speak, at a deeper level of our motivation. It takes charge at the moments when the higher, more precarious conventions have weakened. The possession of actual money lulls our disquietude; and the premium which we require to make us part with money is the measure of the degree of our disquietude."**
>
> (Keynes, 1937a)

This is one of Keynes's clearest statements of the significance of the precautionary demand for liquidity, which is often strangely neglected by orthodox economists, who nonetheless describe themselves as (New) 'Keynesians'.

It is upon these elements that Davidson and others have constructed modern interpretations of the liquidity preference theory of financial markets.

In an uncertain world, spot and forward contracts, sticky prices, legal enforcement, and money provide a stable enough framework to allow a capitalist economy to function. Contractual agreements allow us to plan for the future, and set up in advance a schedule of anticipated incomes and liabilities that we can with some degree of confidence expect to arise.

Based on our existing and anticipated future wealth and our current disposable incomes; our confidence or insecurity that these expectations will at least be met; and given the level of consumption we are habituated to, the reference groups we identify with or seek to emulate, and the availability and cost of credit; we decide how much to spend on the output of industry and how much to net borrow or save in the form of money and other liquid financial assets.

In Keynesian economics, households do not for the most part save in the form of illiquid physical assets. Indeed, as Davidson argues (for example, in Davidson 2011, chapter 3), in *The General Theory,* the direct accumulation of real assets by households is regarded as a form of what is perhaps mislabelled as 'consumption' (thereby contributing to effective demand and to employment), and there is a distinction between capital investment decisions (made within businesses) and the acquisition of shares in business (decisions made mainly by or on behalf of households). Big businesses and households are distinct decision making units, with a 'divorce of ownership from control' within corporations, and households for the most part not directly purchasing the means of production.

> **"So long as it is open to the individual to employ his wealth in hoarding or lending money, the alternative of purchasing actual capital assets cannot be rendered sufficiently attractive (especially to the man who does not manage the capital assets and knows very little about them) except by organising markets wherein these assets can be easily realised for money."**
>
> (Keynes, 1936, pp160-161)

Household saving takes the form of the acquisition of liquid financial assets. This produces a two stage process in the savings decision:

- Firstly, the consumption versus saving decision – in Keynes, saving here is mainly seen as a residual, in the context of the theory of the consumption function.

- Secondly, portfolio choice – the decision regarding which financial assets to hold.

Davidson defines money as a *'fully liquid asset'*. To the extent that we face known or contingent future financial obligations denominated in terms of money, the only certain way of guarding against insolvency is to hold some of our wealth in the form of the monetary asset. Money is defined as the asset with the maximum possible liquidity premium.

Under normal circumstances, we will hold some of our wealth in the form of money and the rest in the form of other liquid assets, such as term deposits, and holdings of securities such as various forms of bonds, equities and managed funds. In recent years, derivative contracts have joining the list of apparently liquid financial assets.

Especially during periods of rising property markets, although physical property is not a genuinely liquid asset, it may come to be regarded as such.

Liquid financial assets have a yield, expressed in Keynesian terms, of $q+a+l$. In terms of equities, q represents an anticipated dividend yield, a is the expected capital gain, and $-l$ can

be identified as a subjective measure of the possibility of loss. It is tempting then to map Keynesian uncertainty in liquidity preference theory into a subjective measure of risk in the neoclassical modern theory of finance; define risk in terms of the expected periodic standard deviation of returns; and move on to portfolio theory and the rest of the efficient market approach to finance.

This, however, would be misleading. The assumption of normality built into the estimation of risk in modern finance theory is flawed, and speculative financial markets, though they go through periods of tranquillity, are often more volatile places and more subject to bubbles and panics than the efficient market theory implies. In other words, based on historical data, asset return frequency distributions appear to have fat tails and negative skew, or leptokurtosis, relative to the normal distributions of the efficient markets theory (Mandlebrot & Hudson 2004).

Merging Keynes inappropriately into the efficient markets Markowitz portfolio theory was the route taken by Tobin (1958) in his portfolio balance approach to financial markets, and it involves ignoring the uncertainty and psychological perspective of Keynes's analysis, and acceptance of the ergodic hypothesis of neoclassical theory.

Financial markets are one place where prices do move towards market clearing temporary equilibrium positions, and according to liquidity preference theory this will involve portfolio choices so that $(q_i + a_i)$ equals $(l_m - l_i)$, where l_m is the premium that money carries as the fully liquid asset and l_i is the premium carried by the less than fully liquid asset class.

In general terms, liquidity refers to the ease, freedom from uncertainty of value, and in particular, freedom from significant loss with which an asset can be converted into the form of money. On financial markets, liquidity is in part the result of an orderly market structure. In an orderly market, mechanisms exist whereby participants can be confident that there will be continuous trading and no significant discontinuities in market prices.

Davidson (2009) has emphasized the misunderstanding amongst many participants in the new markets for asset backed securities and credit default swaps which led them to believe they were holding assets traded within an orderly market structure when it was not the case.

An increase in the precautionary demand for money involves a move by the private sector towards holding wealth in the form of more liquid assets. This in itself will trigger a portfolio shift out of more uncertain financial assets, as the additional liquidity premium on money becomes more prized, while the anticipated values of *q* and *a* for less than fully liquid financial assets are likely to have fallen.

Under these circumstances, the realisation that what were believed to be orderly financial markets, have no buyer-of-last-resort behind them, ensuring that a market price near to the most recently quoted price is possible for market participants, is liable to trigger a meltdown and financial market failure. This is exactly what happened on some financial markets – particularly for the newer derivatives - in the US in 2008. Both *a* and *q* have fallen, and $(l_m - l_i)$ has discontinuously increased, as the demand for the security of fully liquid assets increases, and the perceived liquidity of assets previously seen to have a high level of liquidity collapses,

in failing markets. Fully liquid assets in a crisis include the domestic currency debt of monetary sovereign governments, which explains the flight to US government securities in 2008.

I will argue in chapter six that monetary sovereign debt is best viewed as a form of broad money, and not as 'debt' in the conventional sense of the term, which is of a liability which has to be paid back at some future date. Government bonds can be exchanged for another government liability on maturity, in the form of reserves at the central bank, which can then be withdrawn from circulation by running a fiscal surplus. However, they are not repaid in any meaningful sense of the term.

It is uncertainty that creates both a demand for liquidity, and changes over time in the value of the additional liquidity premium on holding money. During periods of tranquillity and relatively stable but rising stock markets, the role of money in private asset portfolios is reduced, and there is a shift towards less liquid and more risky assets. At the same time, there is a willingness on the part of borrowers to accumulate more debt and more fragile financing structures. This is where Davidson's interpretation of Keynes's Liquidity Preference Theory and Minsky's evolutionary Financial Instability Hypothesis fit together very neatly.

3.4 Minsky and Financial Instability

While Davidson has clarified, interpreted, and updated Keynes, Minsky travelled further. He took Keynes's description of an unstable economy in *The General Theory* and his subsequent papers, and built a complete descriptive model of an evolutionary, crisis prone capitalist

economy. Minsky was less of a Keynesian fundamentalist than Davidson, and more open to other influences, including evolutionary and institutional economists such as Schumpeter and Henry Simons, and the work of Kalecki. His vision of the financial system is as a place of evolutionary change based on innovations driven by profit maximising bankers. He was interested in similar issues to Davidson, and their views on the distortion of Keynesian economics after 1945 are virtually identical. Nonetheless, he was also interested in extending and completing Keynes' model of the economy, and using it to better understand how capitalist economies evolve over time.

Davidson has concentrated on the role of uncertainty in creating under-employment equilibrium outcomes in the Keynesian model. Minsky concentrated instead on the upward instability which generates financial instability and endogenously generated downturns, again within Keynes' model of the economy.

Minsky shared Keynes' vision of the role of uncertainty and degrees of belief in destabilising financial markets and the real economy.

> **"Whenever a model with a weak degree of belief guides the actions of an agent, as evidence accrues, initial models are likely to be abandoned and a new set substituted. When this happens, sharp changes in the behaviour of agents and of the economy are likely to occur."**
>
> (Minsky 1996, p361)

In *The General Theory*, 'Keynes put forth an investment theory of fluctuations in real demand and a financial theory of fluctuations in real investment' (Minsky 1975, p55).

Keynes did not fully develop the financial theory, and moreover, his references to it are sometimes obscured by a milder form of non-financial cyclical behaviour described in chapter 18 of *The General Theory*. The cycles of chapter 18 are consistent with an economic system which Keynes described as 'not violently unstable' and where the financing of capital assets was not a source of instability – cycles such as those described in the same decade and subsequently by Kalecki (as in chapter 11 of Kalecki 1971), and in post-war accelerator-multiplier models, where parameter values have been selected to make them non-explosive. These are the cycles of non-chaotic mathematical models, and are not a description of an economy where financial collapse creates the conditions for a prolonged depression that threatens the social fabric.

However, in chapters 12 and 22, and in the 1937 QJE paper, there are the essentials of *'a vigorous cycle, which does have booms and crises'* (Minsky 1975, p 60) – a system driven by finance and uncertainty, consistent with the US boom of the 1920s, and the subsequent crash into depression after 1929, or the so-called 'Great Moderation' and the 'Great Recession' of the 2000s.

Here we have the onset of a great recession in 2008 or depression in 1929, as the culmination of a period of growing financial fragility -

> **"There is, however, another characteristic of what we call the trade cycle which our explanation must cover if it is to be adequate; namely, the phenomenon of the crisis – the fact that the substitution of a downward for an upward tendency often**

takes place suddenly and violently, whereas there is, as a rule, no such sharp turning-point when an upward is substituted for a downward tendency"

(p 314)

"It is of the nature of organised investment markets, under the influence of purchasers largely ignorant of what they are buying and speculators who are more concerned with forecasting the next shift of market sentiment than with a reasonable estimate of the future yield of capital-assets, that, when disillusion falls upon an over-optimistic and over-bought market, it should fall with sudden and even catastrophic force"

(pp 315-316)

(Keynes, 1936, chapter 22)

Keynes left clues, but did not provide a complete theory of a system where financial crises can strike with 'catastrophic force'. For such a model, we have to turn to Minsky and the financial instability hypothesis. An understanding of Minsky's extension of Keynes' model has fundamental implications for the conduct of economic and regulatory policies:

"Because the financial instability hypothesis leads to a different view of the normal functioning of capitalist economies, it has implications for economic policy that differ from those of the standard economic theory of our time."

(Minsky, 1982, p90)

For both Keynes and Minsky, the orthodox neoclassical model is at best outdated and likely to be highly misleading, in that it takes the focus away from the major sources of recurrent instability:

> **"Whereas classical economics and the neoclassical synthesis are based upon a barter paradigm – the image is of a yeoman or a craftsman trading in a village market – Keynesian theory rests upon a speculative financial paradigm – the image is of a banker making his deals on Wall Street."**
>
> (Minsky, 1975, p 55)

Having identified investment spending as the most volatile element in effective demand, and therefore as the most obvious proximate cause of business cycle fluctuations, Keynes discussed the determinants of private fixed capital investment using both the well-known marginal efficiency of capital approach and his less discussed two-price theory. In terms of modern business finance, these approaches are analogous to the distinction between internal rate of return and the net present value investment concepts.

The net present value and the internal rate of return criteria are equivalent when investment projects are evaluated individually against the opportunity cost of capital, assuming standard cash flows –that is, negative net cash flows at the commencement of the project, followed by positive net cash flows later on, with only one sign change. If anticipated cash flows are non-standard, or if mutually exclusive investment projects are under consideration, the IRR approach is subject to essentially the same issues as were highlighted in the Cambridge critique of the aggregate production function – namely, the possibility that lower interest rates might cause switching between alternative investments and decrease rather than

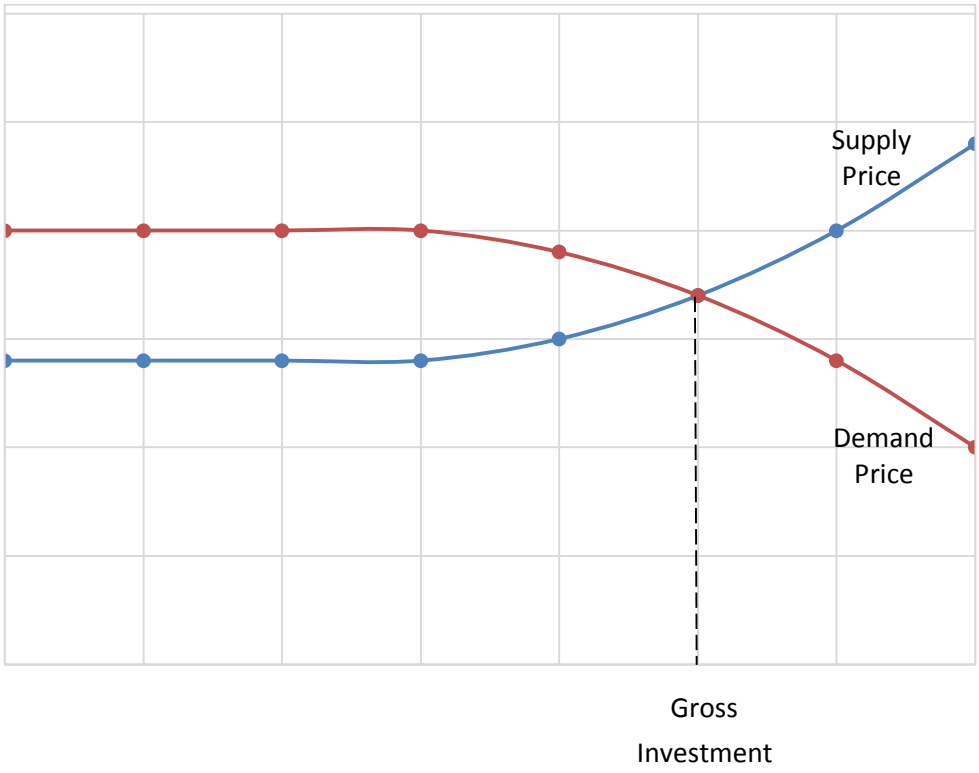
increase the capital intensity of production. The NPV rule is a technically superior rule for investment decision making, given the ability to forecast future cash flows in an ergodic environment and the aim of maximising shareholder wealth.

A fundamentalist Keynesian would of course accept neither ergodic cash flows for long term projects nor the assumption that company executives necessarily make decisions in the interests of their shareholders. There is however another reason for preferring the two-price model, which is its greater flexibility as a tool for explaining the cyclical instability of gross investment spending.

Minsky's version of the Keynesian two-price model is central to his analytical framework. It has some similarities to Tobin's neoclassical Q-theory of investment, but provides a greater wealth of insights into the evolution of a modern, capitalist economy with sophisticated financial institutions. It is linked to Minsky's discussion of hedge, speculative and Ponzi financing; and even to his discussion of the evolution of a capitalist system from the 'managerial capitalism' of the immediate post-war years to the crisis-prone 'money-manager capitalism' which had progressively supplanted it by the time of his death in 1996.

In its original form, it relates to the financing of capital assets within business organisations. However, with only slight amendments it is readily applicable to the issue of rising household indebtedness in a rising property market, which is widely accepted as the proximate cause of the recent financial crisis.

Figure 3.1: Minsky's Keynesian Two-Price Model of Investment



The two prices are the supply price and the demand price of new capital goods (see Figure 3.1). The relatively stable supply price is determined just like the prices of any consumer durables, with a Kaleckian mark-up on prime costs which reflects the cost of short term commercial finance and the degree of monopoly in the capital goods sector. The relevant intercept represents the resulting purchase cost of a newly produced representative capital good in the absence of any external financing. This is the constant, up to the point where investment spending can be financed entirely out of retained earnings.

The more volatile demand price involves either a subjective managerial estimate of the present value of the future net cash flows that new capital equipment can be expected to generate, where both forecasts of future cash flows and the discount rate are highly subjective and prone to discontinuous change, or the price of existing capital goods as reflected in equity prices on the stock market, which are even more prone to volatility. There is no assumption of diminishing marginal physical productivity, nor necessarily an assumption of a diminishing marginal efficiency of capital.

To an orthodox economist, the managerial and stock market valuations ought to be the same thing, being set in efficient financial markets, with prices reflecting objective estimates of expected cash flows and discount rates based on systematic risks, and a market risk premium reflecting average investor risk aversion. The orthodox story is one of relative stability in an ergodic environment.

Within this orthodox framework, there is not much room for psychological factors to influence market valuations of corporate assets. The core orthodox model is not a representation of modern capitalism – not in 2015 and not even in 1936 – and the complex and multi-layered financial system is a source of instability which has been largely ignored by orthodox economists, apart from the period immediately following a crisis.

> **"With the separation between ownership and management which prevails today and with the development of organised investment markets, a new factor of great importance has entered in, which sometimes facilitates investment but sometimes adds greatly to the instability of the system"**
>
> (Keynes, 1936, p 150-151)

The demand price of capital goods pertaining to Keynes and Minsky is more complex, being determined in a world where managers make decisions with the aim of corporate survival and growth, and where finance and financial markets both facilitate capitalist development and create its primary source of instability.

If we take the managerial estimate as the basis for valuing new capital goods, we must refer to Keynesian uncertainty and the role of 'animal spirits'. Some lip service is generally paid, at least in larger organisations, to the principles of orthodox financial management, with a conventional cost of capital often loosely based on a dividend valuation or a capital asset pricing model estimate of the cost of equity, and forecasts of net cash flows. However, such forecasts are at best the result of a highly subjective set of beliefs regarding future business conditions, and are far better interpreted as being made under conditions of uncertainty. As discussed above, the distinction between subjective and conventional expectations held with low degrees of confidence and ontological uncertainty is almost meaningless. If you have been taught to develop scenarios and to state subjective probabilities, you may well do so. However, the method you are using does not imply stable probabilities, in which it is legitimate to retain a high degree of belief.

> **"Most probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits – of a spontaneous urge to action rather than inaction, and not as an outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities. Enterprise only pretends to itself to be mainly actuated by the statements in its own prospectus, however candid and sincere. Only a little**

more than an expedition to the South Pole, is it based on an exact calculation of the benefits to come. Thus if the animal spirits are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die; though fears of loss may have a basis no more reasonable than hopes of profit had before."

(Keynes, 1936, p 161-162)

Minsky emphasizes current corporate cash flows as a link between the past, the present and the future, in that they must : (1) cover the cash flow obligations which are the result of previous investment and financing decisions; (2) provide a source of finance for current investments which does not involve the emission of new financial liabilities; and finally,(3) influence expectations of those future uncertain cash flows which are the reason for current investments in new long-lived capital assets. Since capital assets are generally illiquid and capital investment decisions often irreversible and crucial for the future performance and survival of a business, the precariousness of expectations regarding future cash flows reinforces the potential for instability.

Previous investment and financing decisions have created the current corporate balance sheet, which is the starting point for this year's decisions. Current decisions imply further changes to the balance sheet, which will create future obligations (including interest, dividends and other contingent and non-contingent cash flows).

There is also a potential arbitrage between fixed capital and financial assets – the basis for Tobin's orthodox Q-model and stressed by Keynes in chapter 12 of the General Theory:

> **"For there is no sense in building up a new enterprise at a cost greater than that at which a similar existing enterprise can be purchased; while there is an inducement to spend on a new project what may seem an extravagant sum, if it can be floated off on the Stock Exchange at an immediate profit."**
>
> (Keynes, 1936, p 151)

This ties managerial estimates of the value of new capital assets to the market's often volatile price of existing assets. It is not, of course, the only link between stock market valuations and managerial investment decisions. Rising equity prices mean capital gains and rising financial wealth for households, and also a climate of growing confidence, encouraging rising consumer demand in the future. The increasing significance of stock market wealth in household balance sheets, and consequent widespread acceptance of Modigliani-style consumption functions where financial wealth is a determinant of consumption, reflects an evolution away from managerial capitalism and towards money manager capitalism, which has been a driver of growth but also of instability in recent decades. (Cynamon & Fazzari 2011)

Rising share values also increase the borrowing capacity of listed firms, increase the confidence level of business executives and bankers, and encourage the erosion of margins of safety and changing attitudes towards external finance.

This implies that the interpretation of the demand price for new capital goods, as based on a managerial assessment of the present value of expected future net cash flows, must be balanced against the market price of existing capital goods as determined on the stock market, dominated by institutional money managers and short term, speculative portfolio decisions.

Minsky's analysis incorporates what Keynes called 'lender's risk' and 'borrower's risk', and also draws on Kalecki's 'principle of increasing risk'.

Lender's risk 'shows up in financial contracts in various forms: higher interest rates, shorter terms to maturity, a requirement to pledge specific assets as collateral, and restrictions in dividend payouts and further borrowing are some of them.' (Minsky 1975, p107).

It refers to the (mainly contractual) additional explicit and implicit costs of acquiring new capital goods which are born by a firm when additional external finance is used to finance such acquisitions.

The existence of lender's risk increases the value of the net supply price of new capital goods, where, in this context, net supply price is the purchase price of capital goods plus marginal lender's risk.

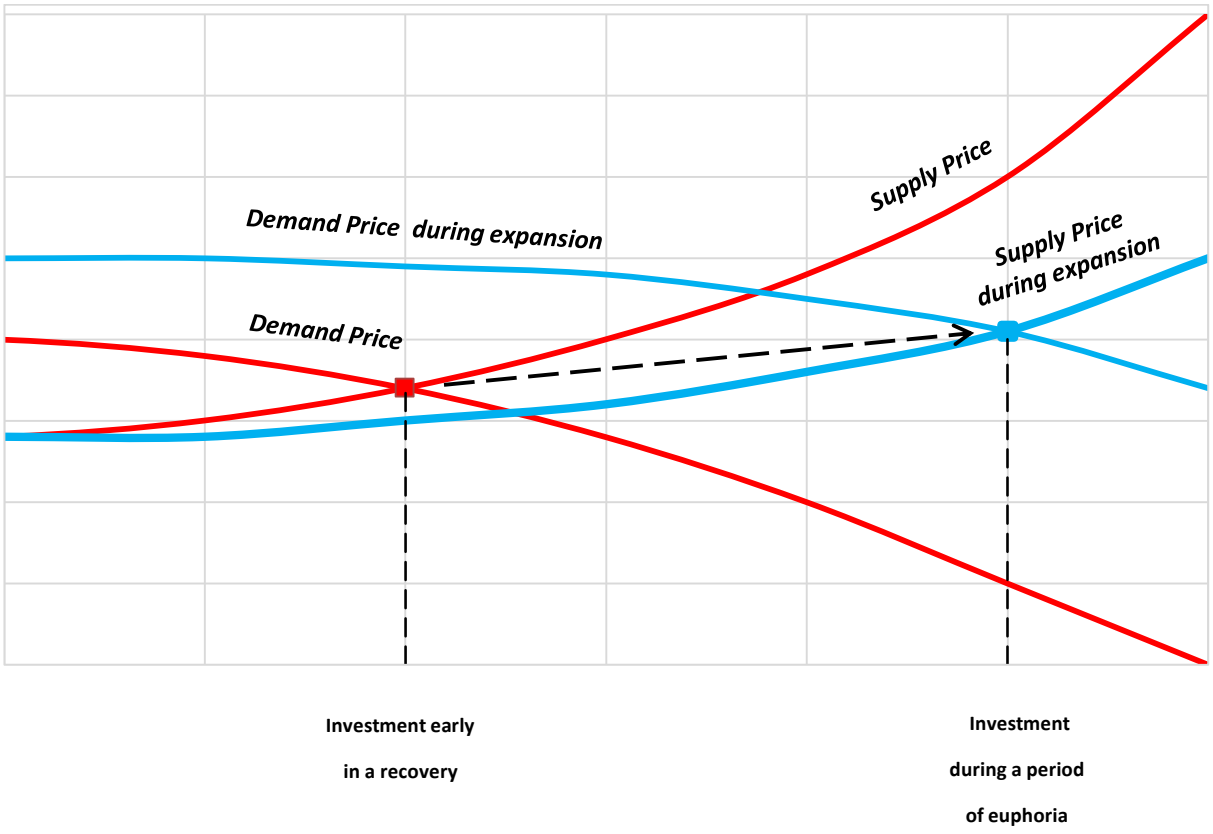
Borrower's risk refers to the erosion of margins of safety in uncertain future corporate cash flows, as liquidity is reduced and financial commitments are increased by increasing the ratio of investment that is debt financed (or at least paid for using external finance, as opposed to retained earnings).

The existence of borrower's risk reduces the marginal valuation of new capital goods, decreasing the net demand price.

This is not the world of Miller-Modigliani capital structure irrelevance (1958), where: (1) firms are just a veil between efficiently diversified portfolio investors and capital assets; (2) risks can be precisely identified and divided up between debt owners and equity holders; and (3) uncertainty and liquidity are ignored. Neither is it a Miller-Modigliani world amended by tax concerns, or even asymmetric information and signalling. There is little doubt, and indeed it is widely accepted, that Modigliani and Miller's theorems played a role in changing attitudes towards debt, risk, and liquidity from the 1960s.

This is the real world of uncertainty, shifting conventional attitudes towards illiquidity and acceptable financing structures, and a potentially volatile stock market. If we are to refer to the intersection between the schedules as an equilibrium, it is a shifting one, with the potential for cyclical behaviour and a discontinuous downturn during a crisis.

Figure 3.2: Investment during a Period of Euphoria in The Two-Price Model



"If the economy is endogenously unstable, then policy based upon the assumption that the economy is endogenously stable is likely to be inept"

(Ferri & Minsky 1992, p12)

It is necessary to introduce Minsky's (now) well-known distinction between hedge, speculative and Ponzi financing at this point. Hedge financing implies that the anticipated operating cash flows of a business (or other economic agent) are sufficient to repay both

interest and the principal on accumulated financial liabilities. Speculative financing implies that cash flows are at least sufficient to cover interest obligations, but that the business (or other economic agent) needs to roll over debt as it matures to remain solvent. Finally, Ponzi financing implies that cash flows are insufficient even to cover interest obligations, so that the agent needs to issue additional debt to raise the cash to service its existing interest obligations.

Agents with hedge financing have robust balance sheets. In the absence of a significant unanticipated downturn in operating cash flows, they are not exposed to potential financial distress caused by increasing liquidity preference in the financial system.

Those with speculative financing, and of course there is a continuum of speculative financing profiles, have potentially fragile balance sheets – particularly if their liabilities are short term in nature. A downturn in financial markets and a tightening of lending by financial institutions could lead to forced asset sales and, potentially, given falling asset markets, insolvency.

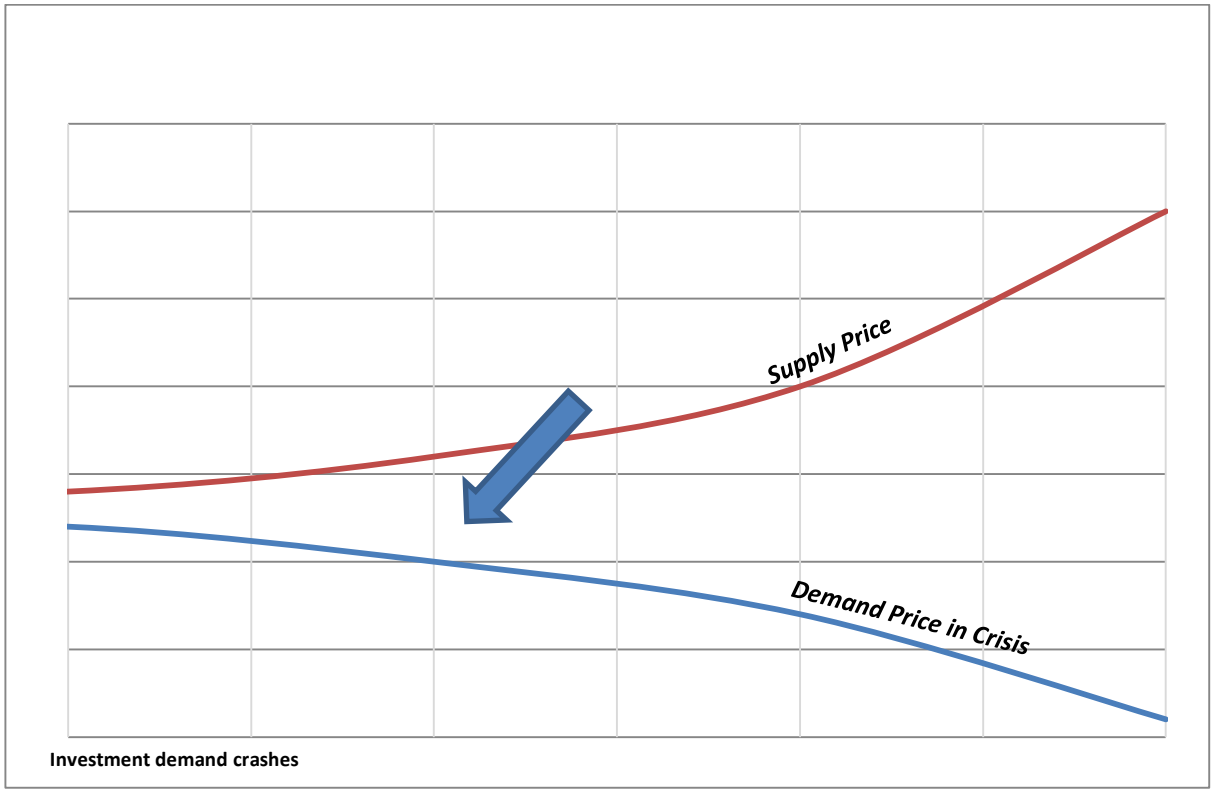
Ponzi financing is unsustainable (hence the name), and Ponzi balance sheets can only be rational in any sense of the term where capital gains and/or future increases in net cash flows facilitated by current debt financing can credibly be expected to justify a gamble on a highly fragile current balance sheet position. Even if this is realistic, any near-term tightening in financial markets or lending practices will force asset sales and threaten insolvency.

Table 3.1: Private Balance Sheets in Minsky's Financial Instability Hypothesis

Hedge Finance	**Speculative Finance**	**Ponzi Finance**
Normal cash flows cover debt and principal repayments	Normal cash flows cover interest payments	Normal cash flows do not cover interest payments
Robust balance sheet	Potentially fragile balance sheet	Unsustainable balance sheet
Impact of accelerating economic growth on balance sheets ⇐ ⇐		
But stability breeds (endogenous) instability ⇒ ⇒		

In the classic version of the financial instability hypothesis, Minsky's two-price model of investment is combined with this classification of financing structures, to tell a story which Palley (2010) has described as 'success breeds excess breeds failure'. The result is a model of endogenous instability, consisting of short run Minsky cycles (mitigated by institutional 'thwarting processes') and long run Minsky cycles (characterised by a long process of system-wide memory loss regarding the potential for a major crisis, culminating in a transformational Minsky Moment and potential Fisherian debt deflation).

Figure 3.3: Collapsing Investment Demand in a Great Recession



During the years immediately following a 'Minsky Moment' (as in 1929, or a very near miss as in 2007-9), private sector agents - both potential borrowers and lenders - develop and retain conservative attitudes towards balance sheet positions. Businesses and households seek to accumulate net financial assets and to establish and maintain robust balance sheets. Davidson would say there is a high degree of liquidity preference on financial markets. Financial regulators act to regulate financing practices and the uses of those financial innovations which are perceived to have contributed to the 'Minsky Moment' (or in the case of a very near miss, engage in a political process where they make at least some attempt to do so). At least some

economists will have their faith in efficient markets and stable growth equilibrium undermined, and, in response, will be more questioning than before of laissez faire and financial deregulation. They may even re-read *The General Theory*.

In the context of the two-price model, there is a high degree of borrower's risk and lender's risk, and, in addition, depressed animal spirits regarding anticipated net cash flows from both existing and newly acquired capital assets. The demand price curve shifts down, and both the demand price and supply price curves increase their curvature. Net capital investment spending dries up during and after a debt deflation.

The provision of liquidity by the central bank and the running of large fiscal deficits by the central government can put a floor under financial markets and corporate cash flows, and in time initiate a sustainable economic recovery.

The role that 'Big Government' can play in promoting recovery via the multiplier was of course a central message of *The General Theory*. Minsky (1986) added a more sophisticated description of financing and of Kalecki's analysis of the determinants of corporate profits to build a fuller analysis of the importance of large fiscal deficits following a major downturn.

In addition to the multiplier effect on aggregate demand, the Kalecki equation demonstrates the importance of a government deficit for the maintenance of corporate profits – both as a source of internal (hedge) finance for investment and as a positive influence on expected future cash flows and the demand price of new capital.

The familiar Kalecki equation (Kalecki 1971, chapter 7) in an economy with no government and no foreign trade, where all labour income is spent and capital income saved is easily derived from the national income accounting identity, as:

$$\Pi = I \qquad (3.1)$$

where Π denotes corporate profits; *I* denotes business investment; and causation is assumed to runs from right to left. Businesses cannot decide to make more profit, but they can make decisions relating to investment spending, and moreover investment plans take place in advance of the current time period. In Kalecki, workers spend what they earn and capitalists earn what they spend, as Kaldor put it.

Introducing consumption out of capital income (C_π); saving out of wage income (S_w); a government budget (*BD* = fiscal deficit); and a foreign sector (*CA* = current account balance), the Kalecki equation becomes:

$$\Pi = I + BD + CA - S_W + C_\Pi \qquad (3.2)$$

Business (after tax) profits are given by investment spending, the government budget deficit, the current account balance, less household saving out of wages, plus household consumption out of capital income. This is based on the national income accounting identity, and on the hypothesis that the principal direction of causation is from right to left.

The role of the fiscal deficit in promoting the recovery of investment spending is obvious. Following an actual or near debt deflation, the propensity to save (and liquidity preference) increases; *I* (of course) collapses; and, in a global downturn, the prospects for a shift in trade towards surplus will be limited.

Under these circumstances, the only factor supporting corporate profitability is a rising government deficit. Far from 'crowding out' private sector investment spending, as might be the case close to full employment where a Taylor-rule following central bank deliberately offsets shifts in fiscal policy via changes in the policy interest rate, after a crisis, fiscal deficits crucially provide the cash flows necessary to drive the recovery of investment spending based on conservative hedge financing.

The third role played by fiscal deficits after a crisis is the provision of a series of default risk-free financial assets to the private sector of varying maturities, meeting the needs of private agents (and especially banks and other financial institutions) for safe and highly liquid assets as they seek to restore their balance sheet positions to a more conservative state. If the non-government sector of the economy, including the foreign sector, wishes to net save, then the only source of nominally safe domestic currency assets is the monetary sovereign domestic government. In the absence of conventional fiscal action to bring this about, the central bank may undertake quasi-fiscal policy itself (fiscal, in the sense that prices are paid for assets which are above what would otherwise be their market values), by swapping such safe assets for risky assets in falling markets, in order to forestall a collapse in the prices of those assets and a debt deflation.

"Big government provides insurance against an utter collapse of profit flows and asset prices, such as happened between 1929 and 1933"

(Minsky 1996, p 359)

So, what may be seen by conventional standards as large fiscal deficits - and the US Federal deficit was 9.8% of GDP in 2009, 8.7% in 2010 and 8.5% in 2011 (Executive Office of the President of the United States 2016, p32) - far from destabilising the system, are essential to its stability and to creating the initial conditions for expansion following a crisis. They maintain demand and employment, maintain profits and encourage private investment, and allow the private sector to move collectively from speculative and Ponzi balance sheets to conservative hedge financing. This will be of relevance in my later discussion of Godley and Lavoie's models and of the policy prescriptions of modern monetary theorists.

The emission of government liabilities during the 1930s and especially during the 1939-45 war generated a particular set of circumstances in the early 1950s. The financial conditions were in place for 'success', starting with a highly robust set of private balance sheets, made possible by large scale government debt issuance. The initial conditions for a long upswing were ideal.

The cyclical perspective within Minsky's financial instability hypothesis ties in with his description of the post war evolution of capitalism towards growing financial fragility and instability, and a progressive movement towards a set of institutions and practices where 'it' (by which he meant 1929) could happen again (Minsky 1982). The two-price model, the balance sheet approach and the financial instability hypothesis, Minsky's '57 varieties'

description of capitalism, and the neoclassical absorption, distortion and virtual elimination of Keynes, are all part of the Minskian model.

> **"Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done"**
>
> (Keynes 1936, p 159)

In 1929 in the United States, enterprise had become a 'bubble on a whirlpool of speculation'. Immediately after the War, corporate and household balance sheets, financing practices, big government, full employment, falling inequality, and financial regulation formed the basis of a more stable 'managerial capitalism'. These super-secure balance sheets were the foundations for a uniquely successful economic era. This is not widely understood in the economics profession, and was completely misunderstood at the time by 'neoclassical synthesis Keynesians'. The fact that it has been so misunderstood has allowed for the gradual substantial replication of the circumstances of 1929, eighty years on.

The 1950s and 1960s were in the most important respects a more successful period than the Great Moderation of 1992-2007. Economies grew more quickly, the distribution of income and wealth became more equitable, broadly defined measures of welfare such as the Genuine Progress Indicator increased, and full employment was maintained, with no major inflation break out, and no major financial crisis.

This last feature is rarely remarked upon:

> **"From the 1930s to the early 1960s, no serious financial disturbances took place. Because of the financial assets and liquidity inherited from World War II, the significantly larger size of the federal government (the results of the cold war and various transfer payment schemes), and some positive uses of fiscal policy to run deficits when needed, the United States, Japan, and the industrialised countries of Western Europe achieved a significantly closer approximation to full employment over a sustained period of time (twenty years) than they had ever achieved before. Occasional mild recessions took place, inflation at modest rates persisted, and sectoral problems such as increasing youth unemployment (especially black) in the United States emerged. But on the whole the economies seemed to be working well. Indeed, their success led to the resurrection of economic doctrines that held that a capitalist economy would tend, by its own workings, to establish full employment."**
>
> (Minsky 1986, p 50)

The absence of financial crises is worth emphasizing. It is not a normal characteristic of capitalism to go through a 30 year period with 'no serious financial disturbances', and given the relatively minor impacts of the disturbances of 1966, 1970 and 1974 (which played a role in the development of Minsky's analysis), we can extend Minsky's period and say there were no systemic crises for 50 years and arguably no Minsky Moments for 80 years.

In *Manias, Panics and Crashes*, Kindleberger lists the following years as ones of financial crises: 1816, 1826, 1837, 1847, 1857, 1866, 1873, 1907, 1921 and (of course) 1929 (Kindleberger & Aliber 2011, p 26). He omits the great panic of 1893, which was described at the time as one of the worst crisis years the USA had yet experienced (Steeples & Whitton

1998). This chronic instability of the US monetary system, both before and after the formation of the Federal Reserve System in 1913 is described in Galbraith (1954).

Including the panic of 1893, there was a financial crisis every ten years or so from the beginning of the industrial age to the 1930s. The proximate cause of every crisis differs from that of the one before, but they were all of systemic significance, and all took place in a financial system and economy without 'instability thwarting' institutions'. There was no Big Government and no Big Bank. The Federal Reserve prior to 1933 did not play the lender of last resort role of a modern central bank. The Federal Government spent only 3.4% of GDP in 1930 (Executive Office of the President of the United States 2016, p31). Real analysis and full employment equilibrium was no description of such a system.

Yet 1816 was roughly when Say and Ricardo were at work on the foundations of classical economics; 1873 roughly when Walras and others were devising the general equilibrium framework; and, by the 1920s, the core neoclassical model was well established (and largely accepted as valid by the young Keynes). With a few notable exceptions, such as Wicksell, economists then, as now, virtually ignored the financial system and did not consider financial instability worthy of their efforts. Economics was the study of a stable system.

Even the establishment of what would eventually become Minsky's Big Bank – the Federal Reserve System – was the work of bankers and bureaucrats and not really of economists (Galbraith, J.K. 1954). The endogenously stable economy of economic theory differed in essential ways from the complex and endogenously unstable social and financial systems of

the real world. Economists and policy makers were using inappropriate tools. For the most part, they still are.

> **"a capitalist economy with sophisticated financial institutions is capable of a number of modes of behaviour and the mode that actually rules at any time depends upon institutional relations, the structure of financial linkages, and the history of the economy"**
>
> (Minsky 1982, p92)

For Minsky, the fundamental instability is upwards, as investment spending increases and balance sheets become gradually more adventurous. Rising business confidence and profits shift the demand price of new capital upwards and diminish both borrower's risk and lender's risk.

Improving business operating cash flows justify previous investment and financing decisions, thus tending to raise retained earnings, increase the market value of equity, and reduce the ratio of debt to equity on corporate balance sheets. The impact of rising profits in an accelerating economy is to legitimise past financing practices and to make balance sheets appear more conservative, thereby shifting business financing profiles towards the left in the above chart.

This further reduces lender's and borrower's risk, encourages even higher levels of investment spending, and leads to the use of further external finance and increased gearing. Businesses using higher levels of debt to expand are most successful, with higher levels of

leverage multiplying returns to shareholders. Financing decisions move corporate balance sheets back towards more speculative and less robust positions.

While Real GDP grows sufficiently to validate existing financial structures, there is a general decrease in liquidity preference and risk perception and aversion, a relaxation of attitudes and practices by borrowers, lenders, regulators and policy makers, and an apparent justification of these attitudes based on low default rates, high levels of investment and profitability, and strong market value/book value stock ratios.

A private sector that is accumulating net financial liabilities also allows the government budget to move towards surplus with a constant or even a deteriorating international trade balance. The government is able to congratulate itself on its fiscal discipline and sound economic management, even while the economy is evolving in a highly unsustainable manner, with private balance sheets becoming increasingly dangerous.

This was a feature of the Clinton years in the USA, with reports written for the administration by economists on the implications of the complete elimination of the Federal Debt by 2013 (US Treasury 2000), and discussions concerning appropriate ways to spend the consistently large fiscal surpluses which were anticipated (see Mosler 2010, p45, for a description of a conversation with Vice President Al Gore). Only economists and politicians with no understanding of Minsky's balance sheet approach to the financial system, Godley's stock-flow consistent approach to macroeconomic forecasting, and the principles of modern monetary theory could possibly have believed that such as outcome was feasible. It was

infeasible, since it required a continuing deterioration in private sector financial balance sheets, to the point where increasing financial fragility made a downturn inevitable.

The trigger for a discontinuous downturn can take a variety of forms. It could arise outside the domestic economy; it could be the collapse of a particular speculative asset price; it could result from rising cost push pressures; or it could be demand pull inflation, or some combination of these. The trigger could be a small rise in the policy interest rate, or some other policy to tighten aggregate demand. In Minsky's analysis, rising inflation and a consequently tighter monetary policy are generally the trigger. Falling asset prices, rising liquidity preference, a greater awareness of and aversion to further uncertainty, and a deteriorating outlook for future earnings drive agents with fragile balance sheets into illiquidity and potential insolvency.

Prior to the 1930s, such a crisis could and generally did happen frequently, and at an early stage during a capitalist expansion, and be followed by a series of bankruptcies and bank failures, until balance sheets and financing practices had become more conservative. Bankruptcies and failures created a new set of initial conditions, eventually facilitating the next upswing.

After 1945, private balance sheets were very strong (as shown in Minsky 1986) and financial markets and practices heavily regulated (most obviously, via the Glass-Steagall Act, segregating commercial from investment banking in the US). Financing was mainly conducted via conservative commercial banks with strong long term relationships with their customers. Broadly Keynesian policies were employed to maintain approximately full employment and

to narrow income inequalities, and there was a (temporarily) stable international monetary system, based on the US dollar and the US economy. In addition, rising productivity and living standards, a shared memory of the Great Depression and the subsequent conflict (World War Two), and corporate and industrial relations norms added to the stability of the system. This was the era of shared prosperity capitalism, or what Minsky called 'managerial welfare state capitalism'

Minsky was not only a financial Keynesian, he was also more broadly an institutional economist, and understood the role played by a particular set of historical circumstances in allowing for the long period of moderate inflation and close to full employment, under a form of shared prosperity capitalism, with virtually continuous increases in median real wages, and falling income and wealth inequality. 'The trade-off between the full employment and inflation of the 1960s and 70s was the result of the particular institutional structure of the time' (Minsky 1996).

Most of all, the Great Depression, World War II, and Keynes had left as a legacy Minsky's Big Government and Big Bank. The Big Bank was the lender-of-last-resort and the financial asset buyer of last resort, which acted to abort incipient financial crises. The Big Government was an institution with a large enough budget to stop 'it' (a great depression) through counter-cyclical movements in the fiscal deficit. Persistent government fiscal deficits allowed the private sector to consistently net save in a growing economy.

What this meant was that when, after many years, post-war banking began its shift from asset management to more speculative liability management; when financial institutions began to

innovate in search of rising profits, and when non-bank balance sheets began to become more adventurous, the early financial disturbances in the US (of 1966 and 1970, as described in Minsky 1986) could easily be mitigated, with minimal lasting effects on the real economy.

These episodes did not lead to the waves of bank failures and debt deflation of previous financial crises, thanks to the two modern institutions which were now at the heart of the US capitalist system.

Consequently, they did not promote a significant and lasting shift to more conservative private balance sheets and financing practices, but rather the reverse. Bankers and others now knew that the system could not and would not be allowed to fail, and that some institutions and markets had grown too large to be allowed to fail. The impact of the Fed's lender-of-last-resort interventions during the 1970s on banking and on financial markets is described in detail in *Stabilising an Unstable Economy* (Minsky 1986).

We were, at the time, in an environment of two Minsky cycles – a mild, short term one, that was almost though not quite equivalent to the predictions of what became the New Keynesian DSGE model (as explained in De Grauwe 2010, to which I have referred in the previous chapter); and a potentially catastrophic long term one, to which those trained in orthodox neoclassical economics and developing DSGE models were necessarily blind, but which can also be found in *The General Theory*.

The strong growth decades of the 1950s and 1960s led to changes in the economic system which ultimately undermined stability, including waves of changes in bank balance sheets (in

particular, a movement away from asset management based on the use of government debt towards liability management), enabling financial innovations and growing financial fragility.

These innovations included in the US the development of the negotiable certificate of deposit market in the early 1960s; the commercial paper market later that decade; and real estate investment trusts in the early 1970s. Each innovation was an evolutionary step in an expanding financing system; each was accompanied by an investment boom; each ended in a liquidity crunch inspired by monetary policy; and each period of instability was mitigated by last-resort lending by the Federal Reserve.

Just as a 'Big Government' stabilises the economy across the cycle, so a 'Big (Central) Bank' (temporarily) stabilises the financial system.

> **"The 1974-75 debacle (the bursting of the REIT bubble) conformed to the pattern of the episodes of 1966 (the CD-related 'credit crunch') and 1969-70 (the commercial paper 'liquidity squeeze'). In both cases, a run on some institutions or instrument required Federal Reserve action to abort what looked like the beginnings of a financial crisis. In each case, the deficits of Big Government sustained income, generated conditions conducive to business profits, and fed secure instruments into portfolios'"**
>
> (Minsky 1986, p105)

The temporary nature of this stability is due to the fact that the actions of the central bank effectively validate the financing practices that created the incipient crisis. The use of last-resort intervention (and counter-cyclical fiscal policy) to save the system from collapse

prevents a full awareness of the growing fragility of the system, and creates conditions conducive to the next round of profit seeking financial innovations and the development of the next bubble. This is in a sense the famous 'moral hazard' problem. However, it is a nuanced version of the problem relative to that described in the text books, with a more complex psychology, encompassing not only commercial and investment bankers, fund managers, and business managers, but also policy makers and academic economists.

The ability of policy makers to rescue a failing capitalist financing system, and to allow economists to cling to and be reinforced in a belief of self-equilibriating and essentially stable and efficient financial markets, encourages a climate of progressive deregulation and accelerating innovations which add to the underlying fragility of the system. Successive rescues in Minsky's day accommodated inflationary pressures, leading to the next crisis. From the early 1990s, the danger of a crisis emerging which would be difficult or impossible to manage – at least within the current institutional framework – became much greater than before.

This can be described as Minsky's Paradox. An appropriate institutional and regulatory framework and set of balance sheets, allowing for full employment and financial stability, encourages orthodox economists to argue that capitalism is self-correcting and to advocate for the removal of the very institutions, regulations, and financial flows which allowed for the full employment and financial stability in the first place.

By the mid-1990s, the network of social and economic influences on inflation and the financial system had changed fundamentally. At this point there was:

- Globalisation; the increased mobility of capital; accelerating technological change; the rise of emerging economies; the restructuring of high income economies; a period of high unemployment; labour market deregulation; and the decrease in trade union membership and power, that had changed the balance of power in the labour market, making wage led cost-push inflation less likely.

- The market for energy had also changed, so that a prolonged spike in oil and other commodity prices was a less likely consequence of institutional factors.

- Inflation rates had been reduced, in large part due to the supply of cheap goods made possible by cheap labour in low income and emerging economies, and also due to an institutional framework devised to encourage expectations of low, stable inflation in the future. The major element in this framework in many countries was apparently independent central banks setting policy interest rates based on an explicit or implicit inflation targeting (or Taylor rule) regime.

- Reduced government involvement in the economy (outside of the kind of welfare systems of which Minsky strongly disapproved as both wasteful and inflationary, and of military spending) which was both a reaction to and a consequence of changing social norms and attitudes.

The social conditions for low and stable consumer price inflation and the advances in information technology meant that the increasingly deregulated financial system of the

'Great Moderation' period could take dangerous financial innovation further and faster than before. Policy makers and economists were under the illusion that financial markets were at least approximately efficient; that new derivatives would spread risks and allocate them to those best placed and most prepared to bear them; and that the accelerating globalisation of the financial system was a source of stability and not potentially catastrophic instability. The attitude of the Clinton administration was that minimal financial regulation and consistent government budget surpluses were both appropriate and sustainable.

Then, just two terms after Clinton, 'it' very nearly happened again, as the world went into its Minsky Moment. Battered copies of Minsky's great and completely ignored (and at the time out of print) 'Stabilising' book started trading for hundreds of dollars on the internet. This and Minsky's other books were rushed back into print, and policy makers and even mainstream economists at least for a short while started taking Minsky's analysis seriously.

It was almost inevitable that the next step would be to do to Minsky what they had done to Keynes – that is, attempt to incorporate some parts of Minsky's analysis into an essentially core equilibrium model, and omit and ignore the vital elements of Minsky (and of Keynes) which are entirely inconsistent with the model. This is now happening, as orthodox economists attempt to incorporate financial systems and sudden and inexplicable shifts in risk aversion into their general equilibrium models.

They continue to ignore, for the most part, Minsky's 'anti-laissez faire theorem' - the need for effective instability thwarting mechanisms, in order to react to and limit the consequences of the endogenous instability, which is a characteristic of modern, financial, entrepreneurial

capitalism. Orthodox economics has abstracted away the institutional and behavioural basis for the Keynesian model, as explained and developed by Davidson, Minsky and others Post Keynesians outside the orthodoxy.

The economics of Davidson, Minsky, and Keynes is enriched by many of the findings of the psychologists who have contributed towards the emergence of behavioural economics over the past thirty years – namely Kahneman and Tversky, Loewenstein and various colleagues, and (going back further) Herbert Simon. These researchers have brought psychology back into economics, a hundred years after the neoclassical marginalist revolution had used methodological individualism and 'rational' optimising behaviour to drive a wedge between economics and its fellow social sciences.

Minsky's comment that *'stability breeds instability'* (Minsky 1975, and many other times) and Keynes's view that decision makers in both short run and long run decisions base 'their expectations on the assumption that the most recently realised results will continue, except in so far as there are definite reasons for expecting a change', could have been written by a modern behavioural economist.

A period of economic stability, with stories of a great moderation powered by expert monetary policy making and/or apparent advances in productivity made possible by technological advances and widespread deregulation, engenders a neglect of potential sources of instability. Leading economists begin to pronounce on the death of the economic cycle, or say that the problem of depressions has been resolved. Concerns regarding asset bubbles or unsustainable trends in private debts and balance sheets are reasoned away by an

appeal to efficient market theory and lifetime rational expected utility maximisation under a transversality condition. Statistical analysis of value at risk based on recent data indicates that risks are being managed and controlled, and that the system is allocating those risks effectively to maximise system stability.

Orthodox economists fell for all this in the 2000s, the 1990s, the 1980s and many times before. Even a short period of relative stability - or even a period punctuated by incipient crises which the instability thwarting Bank and Government are able to mitigate – is enough for economists to forget the lessons of the more distant past and ignore relevant information (and the likes of Minsky) in the present. This is Minsky's Paradox.

The New Keynesians of 2005, the Neo Keynesians of 1965, and Irving Fisher back in 1929, all believed they had tamed the cycle and permanently abolished prolonged downturns. They mistook temporary social and institutional frameworks in an evolving and complex system as a consequence of increasingly skilled decision making by those aided by the latest economic models, produced within a discipline of progressive linear advances in methods and techniques.

This is one of the most important reasons we need to replace the orthodox model and the orthodox consensus on appropriate macroeconomic management. Our replacement model has Minskian foundations – money, finance and social institutions are essential features, as are complexity and evolutionary changes, which are difficult and sometimes impossible to foresee. This is not the world of the 'optimal monetary policy' so beloved of monetary economists of the 1990s and 2000s. Nor is it the world of the 'fine tuning' of the 1960s fiscal

activists. It is a world where appropriate 'instability thwarting mechanisms' are essential for the avoidance of crisis, and where it is better to avoid crisis and to satisfice than to attempt to optimise based on a flawed model that will only contribute to the next major crisis.

> **"The endogenous instability view of the economy, in which institutional structures and interventions stabilize the unstable, that we have developed, literally stands Lucas on his head. Apt intervention and institutional structures are necessary for market economies to be successful"**
>
> (Ferri & Minsky 1991, p24)

During Minsky's career, the main private sector borrowers were businesses, and debt was created mainly for the purpose of investment in newly produced productive capital assets. The deregulation, competition and innovations of the 'Great Moderation' changed this. After the millennium, corporate balance sheets remained mainly robust, and the build-up of debt was centred on households, and particularly on the acquisition of already existing real estate. The potential triggers for a crisis were the stock market, the property market, and household debt – Ponzi finance had invaded the household sector and the financial institutions directly or indirectly involved in real-estate finance. Ultimately, of course, the crisis was triggered by a downturn in the real estate market.

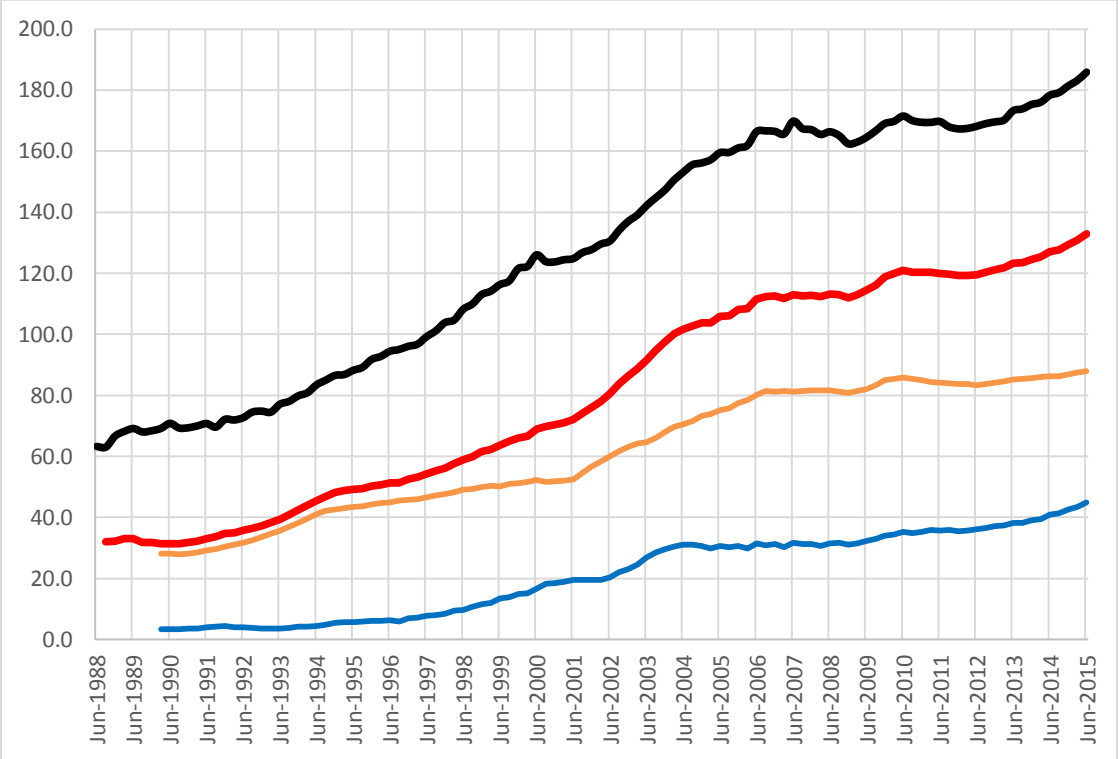
A number of economists, including Palley (2010), have argued that this was not a classical Minskian crisis, given that Minsky's 1970s model described a build-up of corporate, and not household, leverage. However, students of Minsky and those inspired by Minsky, such as Wray (2016), Keen (2011), and Cynamon and Fazzari (2011), have explained that Minsky's

framework is the best available guide to making sense of the circumstances leading up to the crisis. Wray argues that a crisis, such as the GFC, was the logical result of the evolution of the financial system and of policy making that goes as far back as the 1950s. Hence, Wray has referred to a 'Minsky half century'.

Minsky (1987) himself lived long enough to see the beginnings of the build-up of private household debt, and was one of the first economists to warn of the risks of securitisation. Securitisation is another in the list of post- World War II financial innovations which have been associated with a form of investment boom, inevitably leading to a crisis built on representativeness; cognitive ease; the long lost availability of a system memory of major losses; regret avoidance by participants in the bubble; and the moral hazard of what became known as the 'Greenspan put' on asset markets.

The growth since the early 1990s of household debt in Australia, and in particular of mortgage debt, and within that category of debt incurred for the purpose of real estate investment rather than for residential purposes is demonstrated in the following chart:

Figure 3.4: Australian Household Debt to Disposable Income Ratios; Total Debt; Total Mortgage Debt; Owner-Occupier Mortgage Debt; and Investment Mortgage Debt; 1988-2015; per cent.



Source: *Australian Bureau of Statistics*

Keynes was a behavioural economist. Minsky was a behavioural economist. All economists should be behavioural economists. We can't understand how real people make decisions and assess their life circumstances without understanding the views of the leading psychologists and behavioural economists who have made contributions to the study of decision making and wellbeing, and without comparing and contrasting them with the generally implicit psychological foundations of orthodox neoclassical economics. A modern, 'hard', monetary

analysis of the macro-economy, must respect both the fundamental uncertainty of the economic environment, and what motivates the decisions made by and the subjective well-being of real people living within that environment.

3.5 Kalecki and Distribution

It also requires a theory of income distribution. The rejection of real analysis implies a rejection of the technological description of income distribution which orthodox economics derives from production functions. The best place to look for the essentials of such a theory is in the work of the Polish economist who many regard as the co-founder with Keynes of Post Keynesian economics – Michal Kalecki. I am well aware that I am doing Kalecki a great disservice in concentrating on almost solely on his work in this area. I have already mentioned Minsky's use of the Kalecki equation, in discussing the impact of the fiscal balance on corporate cash flows.

His *Selected Essays on the Dynamics of The Capitalist Economy, 1933-70* (Kalecki 1971) includes more genuinely original and significant contributions to the discipline of economics than any other comparable collection, including his independent and in some respects superior (to Keynes) development of Keynesian economics. This is achieved in fewer than 200 pages

Given the power and scope of his work, and the influence he has had on generations of later heterodox economists, not all of whom would be comfortable with the label Post Keynesian,

the almost complete absence of Kalecki's name from modern mainstream texts is both absurd and unfortunate. Even Piketty, in *Capital in the Twenty-First Century* (2014), a work in the classical tradition which has helped make it respectable and even fashionable for orthodox economists to take seriously once again the issue of distribution, makes no reference to Kalecki, and only cursory and dismissive references to Harrod, Robinson and Kaldor.

Kalecki explained that distribution is determined by what he called 'the degree of monopoly' in the economy. The higher the degree of monopoly (imperfect competition), the higher will be the mark up of prices over prime costs (labour and materials), and the lower the share of wages in national output.

A lower share for wages implies a higher share for capital income, which can be interpreted broadly to include incomes for the directors and senior executives of large oligopolistic organisations.

The average degree of monopoly can be boosted over time by an increase in the average size of business organisations; by deregulation of the labour market and reduced trade union membership and bargaining power; and also by the form of globalisation which allows large businesses to shift production internationally. All these factors limit the ability of labour to influence the mark up of selling prices over labour costs, and to defend the share of wages in output.

Such a perspective provides a very different view of the merits and demerits of increasing globalisation to those derived from orthodox international trade theory. Orthodox theorems

such as the Stolper-Samuelson Theorem, neglect the impact of globalisation on Kalecki's degree of monopoly and the distribution of income within countries. Policies advocated to increase international competition can, paradoxically, increase the degree of monopoly. This is particularly relevant to modern trade agreements.

A neglect of Kalecki is important today, when following years of denial the impact of globalisation on bargaining power and national income distribution has only recently been accepted as significant by orthodox economists. Even now, this acceptance is patchy and often very reluctant. It is a weak point in the argument for the further development of multi-national free trade agreements. It is hard for orthodox economists to argue that these are overwhelmingly beneficial, when in the United States median hourly real wage rates have hardly increased in four decades, in spite of an obviously very significant increase in labour productivity.

This has also reduced the risk of an inflationary spiral, since inflation is usually caused by a social conflict between labour and capital, and between different socio-economic groups, where the weakening of the median worker's bargaining power reduces the pressure for such cost push inflation.

It provides a compact explanation for the falling share of labour in national income and the increasingly uneven distribution of income.

Moreover, the increase in the ratio of the market value of capital to national output identified by Piketty explains the pressure on company directors, and indirectly on governments, to further increase the degree of monopoly power, in support of the return on capital in an underemployed economy.

If *P* is the general price level and c is direct production costs (labour and materials), then

$$P = (1+m).c, \tag{3.3}$$

where *m* is the mark-up and *(1+m)* 'the degree of monopoly'.

If *Π* is profits, *O* is overheads (including managerial salaries), *W* is wages and *M* is other inputs (which, if we are discussing the whole economy, can be interpret as imported, and to include imported oil, for example), and we are working on a before tax basis, then

$$Y = GDP = \Pi + O + W \tag{3.4}$$

and

$$\Pi + O + W + M = (1+m).(W + M) \tag{3.5}$$

or

$$Y + M = (1+m).(W + M) \tag{3.6}$$

$$Y = W + m(W+M) \quad (3.7)$$

$$Y/W = 1 + m.j \quad (3.8)$$

where $j = (W+M)/W = 1 + M/W$ (3.9)

In which case, the share of wage labour in GDP, W/Y, is given by

$$W/Y = 1/(1+m.j) \quad (3.10)$$

Not surprisingly, an increase in 'the degree of monopoly' reduces the share of wage labour in GDP.

The same is true of an increase in *j*, which is exactly what happened in the mid-1970s when the price of oil quadrupled in six months. The burst of inflation, and the period of industrial unrest which followed, before political changes and changes in industrial structure the neoliberals finally took over and the unions in the 1980s, was a consequence of workers resisting the fall in their share of GDP which was essential if profits were to be maintained in a stagnating economy. (In Kalecki's model, an increase in *j* raises the share of profit in GDP, while putting downward pressure on GDP).

Alternatively, if *M* is interpreted to incorporate all the demands on income apart from labour and capital income, then an increase in welfare payments relative to wage incomes can be

interpreted as an increase in *j*. This emphasizes the potential for an expansion in government transfers to the unemployed to put downward pressure of the share of wages in GDP and to trigger social-conflict driven inflation. This is one of the arguments for using Minsky's employer of last resort scheme to eliminate involuntary unemployment, rather than relying on welfare to support the unemployed.

Since the 1980s, much of the impetus behind deregulation, globalisation, and financialisation, and changes in the tax structure and accepted role for governments, has been about increasing Kalecki's degree of monopoly, and reducing the ability of workers to defend the share of wages in GDP.

While increasing *(1+m)* increases the profit share in GDP, it does nothing directly to increase the nominal value of after-tax profits, or the rate of return on capital. The level of after-tax profits is given by the equation used above to discuss Minsky's discussion of the role of budget deficits in a downturn.

$$\Pi = I + BD + CA - S_W + C_\Pi \qquad (3.2)$$

If consumption out of profit can be written as the marginal propensity to consume out of capital income (c_c) multiplied by after-tax profit, then (3.2) can be rewritten as

$$\Pi = \left(\frac{1}{1-c_c}\right).[I + BD + CA - S_W] \qquad (3.2a)$$

Except in so far as an increase in the degree of monopoly should increase investment spending or consumption from capital income; or should be accompanied by a decrease in savings out of labour income; or a growing current account surplus or government deficit; then a higher degree of monopoly and share of profit in GDP will not increase the level of profit itself.

Neither will it necessarily increase the return on capital, as can be understood from the following identity (notation as in Lavoie 1992).

$$r = \frac{\pi}{Y}.\frac{Y}{K} = \frac{\pi}{Y}.\frac{Y}{Y_f}.\frac{Y_f}{K} \qquad (3.11)$$

The return on capital is given by the product of the share of capital in national income and the inverse of the capital/output ratio; or, by the product of the share of capital with the degree of capacity utilisation and the inverse of the full employment capital output ratio. If an increase in the degree of monopoly increases the first ratio, then this can be offset by a reduction in the degree of capacity utilisation, and therefore in the output to capital ratio.

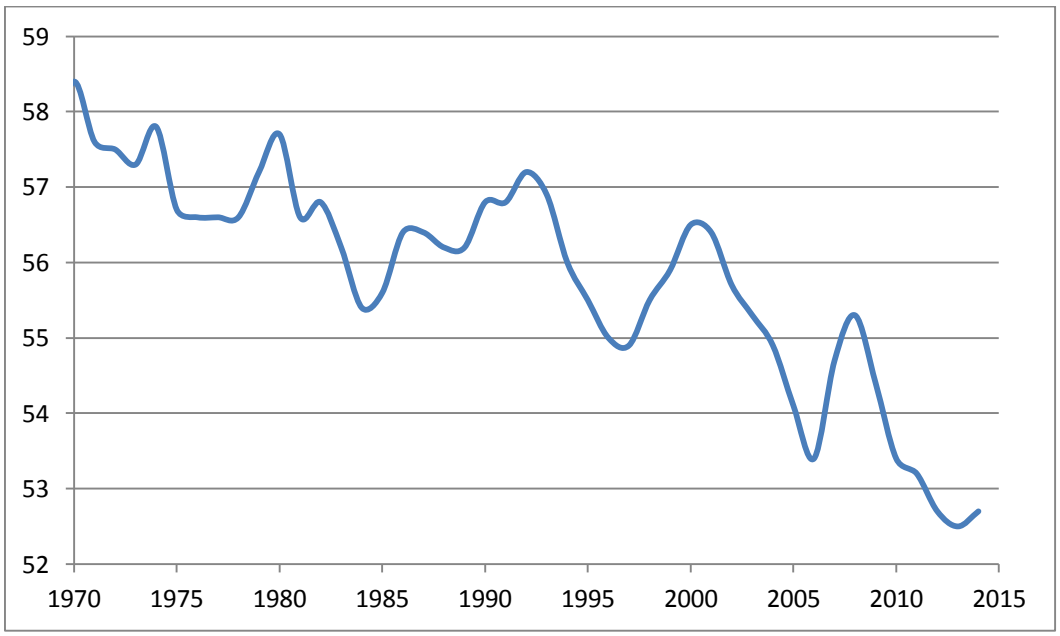
Taking the after-tax profit equation (3.2) and dividing by the share of profits in GDP, we get an equation for GDP itself:

$$Y = \frac{(I + BD + CA - S_W + C_\Pi)}{\pi/_Y} \qquad (3.12)$$

It is, of course, the case that the variables in the numerator of this expression are themselves not independent of the denominator, but nonetheless, this expression is a useful tool for illuminating the economic and financial policies pursued in many countries over much of the past thirty years.

As I have indicated above, the degree of monopoly and profit share have both risen in the high income capitalist economies, which has been combined in most countries with a shift towards a lower share of national income paid out to labour and a less even distribution of both income and (especially) of wealth. This has a negative impact on effective demand, output, and employment, which can only be offset if variables in the numerator increase in proportion to the increase in the profit share. These effects have been particularly clear in the United States.

Figure 3.5: Share of Labour Income in US Gross Domestic Product; 1970-2014; per cent



Sources: Federal Reserve Economic Data; US Bureau of Labor Statistics

While economists such as Robinson and Kaldor, in growth models which were themselves devised during the years of post war full employment, assumed that a higher profit and lower wage share would generate a higher return on capital, and a higher return on capital was necessary for the private sector to finance a higher rate of accumulation and growth, this was based on the assumption that the normal rate of capacity utilisation was given (as in Kaldor 1966). It is this assumption which allowed Samuelson to refer to Kaldor as 'Jean Baptiste' Kaldor (according to Harcourt 2006), since in a sense in their growth models Robinson and Kaldor appeared to have taken the maintenance of full employment for granted, if not actually revived Say's Law.

Such an assumption is not a characteristic of Kaleckian models, or genuinely Keynesian ones, where there is no natural tendency for the utilisation ratio to move to any particular level, and it was clearly a mistake – albeit an understandable one in the 1950s and 60s - to assume fiscal policy would in future necessarily be set to achieve full employment. An increase in the profit share in a Kaleckian model can lead to a fall in the utilisation ratio, due to a shift of income away from those with higher marginal propensities to consume towards those with a lower propensity to consume. So the return on capital and the level of profit can fall or rise, as can the rate of economic growth.

In order to combine an adverse shift in the distribution of income, that had resulted, in part, from an increase in the profit share and a fall in the share of labour income in GDP, with increasing demand and output, governments deregulated the financial system, and governments and central banks ran monetary policies designed to encourage an increase in

household debt, as well as an increase in the ratio of household debt to GDP. This became particularly severe during the late 1990s and early 2000s, and helped to drive the financial system towards increasing fragility. Again, we see the links between Kalecki's analysis and a broadly Minskian view of developments during the Great Moderation.

Structuralist Post Keynesians see the key to a restoration of full employment in a decrease in the profit share in GDP and a rise in the share of labour income once again – particularly the income shares of groups in the lower and middle parts of the income distribution. They are of course correct that there is a role for a more even distribution of both income and wealth to play in the restoration of full employment.

However, modern monetary theorists – as modern day proponents of functional finance – see the solution to the problem of involuntary unemployment as being far simpler. In stock flow consistent and modern money theory models, there is always a level of government budget deficit which is consistent with full employment. They propose that *BD* is set at whatever level generated $Y = Y_f$. By now, I have explained that the complexity of an economy moving through historical time makes fiscal fine tuning unlikely to succeed. Neither Kalecki nor Minsky believed that 'pump priming', or using tax policies and other incentives to encourage higher private investment, would deliver sustained and non-inflationary full employment. Kalecki (1943) stressed the political barriers to full employment, whereas Minsky stressed the problems of uncertainty, inflation, and financial instability.

In modern monetary theory, the existence of a government funded job guarantee allows for a bottom up approach to fiscal policy, where the level of the government budget

automatically moves to whatever level is required to deliver full employment. Full employment under such a system then provides a basis for improvements in the distribution of income and wealth over time.

Prior to a discussion of stock flow consistent macroeconomics and modern monetary theory, however, I want to discuss insights relevant to a new 'hard' economics provided by psychologists and behavioural economists, and mentioned briefly above. Their work is of relevance both to further question the validity of 'state of the art' neoclassical models, and to provide guidance on how real people make decisions and how they develop feelings of subjective well-being. Both these issues are of central importance in economic management, and neither has ever been adequately addressed in orthodox macro-economic models.

CHAPTER FOUR

Behavioural Fundamentals

"Economics without psychological and sociological research to determine the givens of the decision-making situation, the focus of attention, the problem representation, and the processes used to identify alternatives, estimate consequences, and choose amongst possibilities – such economics is a one-bladed scissors".

(Simon 1986, pp 223-224)

"All economics involves psychology. Bayes' rule, the rational expectations assumption and the theory of revealed preference are all psychological assumptions about how people form expectations and what motivates them. The question for economics is not whether to include or exclude psychology, but rather what type of psychology to include"

(Babcock & Loewenstein 1997, p 124)

4.1 People as They Are

I began my first chapter with some words of Ronald Coase, calling for economics to be 'reoriented to the study of man as he is and the economic system as it actually exists'. In chapter two, I described the orthodox macroeconomic model which has dominated the profession, and some of its historical roots, and explained the sense in which is does not correspond to an economic system which has ever existed, or could ever possibly exist. In

chapter three, I outlined some of the contributions towards an alternative and more realistic macroeconomic model, by Keynes and three Post-Keynesians – Paul Davidson, Hyman Minsky and Michal Kalecki. Each was able to clarify and extend the Keynesian/Post-Keynesian model in important ways – thereby providing foundations for a model of Monetary Analysis which can be contrasted with the Real Analysis General Equilibrium model of the neoclassical orthodoxy.

To fully develop Monetary Analysis, so that it provides a realistic description of 'the economic system as it actually exists', it will be necessary in my remaining chapters to discuss in depth the mechanics of modern monetary systems in monetary sovereign economies, and to describe the characteristics of a stock-flow consistent balance sheet approach to modelling an economy, which can be successfully contrasted to the dynamic stochastic general equilibrium model of the current orthodoxy.

Such an analysis is not and cannot be centred on a hypothetical representative household, with the information, cognitive capacity and power to determine the level and nature of economic activity, based only on their preferences and the state of technology. A general equilibrium theorist could rightly point out that the analysis I advocate lacks the formal micro-foundations of dynamic stochastic general equilibrium models.

An appropriate response is that such micro-foundations are neither required nor justified. Macroeconomics is not the same thing as microeconomics, as any first year student familiar with the paradox of savings should be aware. It is inappropriate to build macro-economic models on the micro-foundations of representative households. Instead, microeconomic

behaviour should be consistent with the macroeconomic environment over which we, as individuals, have no control and can have only a limited understanding, and with 'the givens of the decision-making situation, the focus of attention, the problem representation, and the processes used to identify alternatives, estimate consequences, and choose amongst possibilities'.

The aim of economists should be to understand how real people generally react to stimuli, process information, develop feelings of more or less subjective well-being, and make and assess the consequences of decisions. They should not ignore psychological research, and in the twenty first century are rapidly losing any reasonable justification for ignoring the results of neuro-scientific research, in their study of Coase's 'man as he is' (Glimsher 2011). Real people live with incomplete information and often with genuine uncertainty about the future consequences of their decisions. They perceive and react to the world using a brain which, given its high nutritional cost, has evolved to maximise long term evolutionary fitness, and not to optimise every decision. Consequently, they live with the cognitive limitations of such a brain. They are social animals, and, as such, are influenced by the beliefs and the decisions of others, and have complex attitudes towards the welfare of other people, and to issues such as apparently advantageous inequality (Loewenstein 2007).

Their decisions are often constrained by forces outside of their control, and understanding how to organise an economy to give them the opportunity to achieve and sustain a satisfactory level of subjective well-being requires an effort to take this into account.

We need behavioural foundations for our macroeconomics that are more sophisticated than the 'soft economics' approach of assumed expected utility maximisation by a well-informed radical individualist with rational expectations. Behavioural foundations, as with the rest of our analysis, must be as 'hard' as we can make them. People generally make decisions and develop feelings of well-being for good reasons. If we are to provide advice to policy makers, this must be taken seriously.

4.2 People as They Are Not

What is difficult to justify is the continued use of orthodox models built on foundations which are inconsistent with psychological research, and even inconsistent with what is possible, given what is known about the human brain – particularly if these models are to be taken seriously as a guide for real world policy making.

Decision makers within such orthodox models generally have most if not all of the following characteristics:

- They are *extreme individualists and loners* – neither motivated by genuine altruism, nor influenced by others, except through market processes

- They have *stable preferences* – over consumption decisions, inter-temporal wealth allocation decisions, labour supply decisions, and portfolio allocation decisions

- They are *aware* of these preferences

- They are *constrained expected utility maximisers*, making decisions which obey consistency, transitivity, independence and non-satiation in order to optimise, including between goods, between work and leisure and over time.

- They *use information efficiently* and do not make avoidable mistakes, including when forecasting future values of relevant variables

- They have a *correct model of the economy* in their heads which they use for the purpose of forecasting, or are able to learn such a model over time

- They have *unlimited cognitive abilities* to process and evaluate the available information

- They know that other agents also conform to this definition of rationality, and are aware that they do also *(with infinite regress)* (Arrow 1986)

- The information set allows them to construct objective or Bayesian subjective probability distributions relating to future values of economic variables which are actuarially correct (satisfying what Davidson calls the 'ergodic hypothesis'**,** or what Arrow (1986) called *'a stochastic form of perfect foresight'*).

There are two strange things about all this. Firstly, there is little psychological or sociological research to support any of the above, and where apparently supportive work has been done in experimental economics (Smith 2008), it involves experimental designs that few prominent academic psychologists would accept as valid. Indeed, there is an overwhelming weight of empirical evidence – both from well-designed experiments and other data – that human behaviour normally cannot approximate to this description of rationality and generally does not do so (Kahneman 2011). Optimising behaviour by human decision makers in complex situations requires those situations to exhibit a high level of stability over prolonged periods. This is because the heuristics we employ to cope with complex decisions can only approximate to the neoclassical concept of rationality under such circumstances.

Secondly, there is very little debate (amongst orthodox economists) about what it means to be rational, and what there has been, has involved manipulating utility functions and constraints to defend the inviolable rationality axioms, to the extent that rationality has become a tautological concept . Behaviour must conform to the economist's notion of rationality, and therefore any behaviour observed in the real world must be interpreted in such a way as to conform to the notion of rationality. Becker, for example, holds preferences stable and develops models based on what most people would regard as changes in consumer preferences as a change in the technologies used to satisfy some stable fundamental underlying preferences. Vanberg (1994) is one of those who have pointed out how strange this argument appears, from outside the orthodoxy.

This form of reasoning is characteristic of the neoclassical orthodoxy. In order to maintain core axioms, complex logical arguments are constructed to as far as possible theoretically reconcile the real world to the core model. It is essentially deductive and unempirical. It is strange because it is usually far simpler (especially where decision making is concerned) to observe how real humans actually behave and devise a theory which is reconciled to the real world. This is what psychologists (or behavioural economists) seek to do – it is an inductive and empirical approach.

4.3 Different Notions of Rationality

Simon (including in 1986) describes the orthodox definition of rationality as 'substantive rationality' and distinguishes between 'substantive rationality' and 'procedural rationality'.

Procedural rationality defines rational behaviour very broadly, along the lines that people have reasons for what they do – behaviour is purposeful and not purely random and chaotic. This is the same definition of rationality we find in Keynes and throughout Post Keynesian and most heterodox economics. Its breadth (or its vagueness and lack of clarity, as an orthodox economist might say) is an invitation to research what drives human behaviour in different contexts, and not to build theories based on pure logic from unquestioned axioms (or more correctly, axioms which when questioned are often shown to be invalid).

Substantive rationality defines irrational behaviour equally broadly – in its recent form, any deviation from the way the rational expectations hypothesis models behaviour is normally viewed as less than fully rational. Given that modern rational expectations theory in macroeconomics only dates back to the early 1970s, you could argue that this definition became increasingly and absurdly narrow between the 1960s and the 1980s.

The term *bounded rationality* is used synonymously for procedural rationality by Simon. Bounded rationality was presented as an alternative to the substantive rationality of orthodox neoclassical economics, and perhaps 'hyper-rationality' is a better descriptive term for substantive rationality. However, bounded rationality has itself become a term perhaps best avoided now, since it has been adopted by Sargent (1993) as a description of statistical learning consistent with the orthodox and substantive conception of rationality.

As a result of this research, we now have a considerable body of evidence that the following points are valid:

- The orthodox neoclassical definition of rationality is not the only possible definition of what it means to be rational - or alternatively, if you wish to adopt this normative definition of rational behaviour as the only possible definition of what it means to be rational, then irrationality does not mean chaos.

- In a complex, shifting, and uncertain environment and with limited cognitive capacity, such a form of substantive rationality is unattainable

- Human behaviour is broadly rational in another, procedural, sense, although it often appears to contradict orthodox neoclassical axioms, and thereby to generate apparent anomalies such as the Allais Paradox (1953), the Ellsberg Paradox (1961) and the Rabin Paradox (2000), which will be discussed below.

- It is possible to build meaningful theories of rational human behaviour under both risk and uncertainty which are more consistent with empirical evidence than the neoclassical theory, and which make meaningful and useful predictions.

- These theories can be viewed as a logical progression from the expected utility theory of von Neumann and Morgenstern (1944) and Savage (1954), in the same way that their work can be viewed as descendant from that of Bernoulli and even Pascal.

- Macroeconomics can and should be consistent with a society of individuals forming impressions and making decisions based on a form of procedural rationality under Keynesian uncertainty.

- Such a macroeconomics will make very different predictions about the policy space for sovereign governments and the feasibility of achieving or even identifying uniquely optimal policies in a shifting and complex world. This has important implications for modern monetary theory, and for political decisions and economic policy.

- Issues such as subjective well-being, relative poverty, and involuntary unemployment are of enhanced significance within the resulting perspective, which also provides a compact explanation a still credible form of the Easterlin Paradox (Easterlin 1995), and has important policy implications.

> **"We already have in psychology a substantial body of empirically tested theory about the processes people actually use to make boundedly rational, or 'reasonable', decisions. This body of theory asserts that the processes are sensitive to the complexity of decision-making contexts and to learning processes as well."**
>
> (Simon 1986, p223)

We have accumulated a great deal of additional evidence and some more 'empirically tested theory' since Simon was wrote these words. These behavioural theories of rationality, developed by Kahneman and Tversky (1979), Tversky and Kahneman (1974, 1981, 1992), and their collaborators and colleagues, have contradicted the predictions of orthodox neoclassical utility and expected utility theory in many ways, and have been overwhelmingly supported by an increasing weight and variety of evidence. They are also broadly supported by recent neuro-scientific research (Glimcher 2011), and indeed a partial synthesis between the work of behavioural economists and neuro-scientists on decision making and experienced well-being is now well under way.

We have reached a point where expected utility theory can now only be justified as a normative theory of narrowly defined logically rational behaviour under risk, rather than as a positive theory of how real people actually make judgements under risk or uncertainty. As a positive theory, expected utility theory has been refuted. It has been refuted by a series of consistently anomalous observations, both in experimental and real world settings; it has, or should have been, substantially superseded by a more successful, positive theory, known as prospect theory; and it has even be refuted as a positive theory, by recent evidence from neuro-science, indicating that the human brain is not capable of consistently meeting the axioms of expected utility theory, and is wired in a way far more consistent with the predictions of prospect theory. The evidence in support of neural reference dependence, which is an important departure from expected utility theory, is particularly impressive (Glimcher 2011, chapter 15).

It is certainly possible to defend expected utility theory as a narrow, normative theory of substantive rationality under risk, but this defence provides no justification for the development of models in financial and macroeconomics based on representative agents who are expected utility maximisers, which are used to generate results intended to guide real world policy decisions.

Orthodox models can be unfit for purpose for a variety of reasons, some of which I have already discussed. The failure of expected utility theory as a positive model of decision making, and the existence of at least one more successful alternative positive theory, means

that the nature of even the very first equation in typical micro-founded orthodox models should be sufficiently problematic for us to question the purpose of reading any further through such models.

Once we are free of the blinkers imposed on us by expected utility theory, and the rational expectations hypothesis, which came later but is a logical consequence of expected utility maximising choice, we can consider the implications of issues such as framing, mental accounting, reference dependence, and loss aversion, for economists and policy makers.

> **"In situations that are complex and in which information is very incomplete (i.e. virtually all real world situations), the behavioural theories deny that there is any magic for producing behaviour even approximating an objective maximisation of profits or utilities. They therefore seek to determine what the actual frame of the decision is, how that frame arises from the decision situation, and how, within that frame, reason"**
>
> (Simon 1986, p223)

4.4 Procedural Rationality and Post Keynesian Economics

In a complex and uncertain set of circumstances, decision making can at best be consistent with a form of procedural rationality. Decision makers who have to live with limited

information and realistic cognition in a changing environment, with a continuous stream of influences and potentially useful information to deal with, and a variety of decisions to take of varying degrees of significance, complexity and duration, cannot conform to the substantive rationality of general equilibrium models. It is clear that:

- We are not, in general, extreme individualists and loners. Empathy is part of our genetic make-up, and for good reasons, but also partly culturally acquired. We are a highly social species. We are heavily influenced by others, by social norms and institutions. We make comparisons, we benchmark, and we assess fairness. These ideas are hardly new (Veblen 1899), and have never been shown to be insignificant.

- We are often unaware of our very plastic preferences. Not only do our preferences evolve, but the structure of the brain changes over time (Doidge 2007), so that preferences and decisions are path dependent. Major life events – such as a period of involuntary unemployment – can have real and permanent impacts.

- We often make decisions which appear inconsistent, intransitive, and apparently suboptimal, without this being a sign of irrationality. We often strive for consistency, in making decisions over time, but are often unaware we are being inconsistent. Where consistency prevails, such consistency may be arbitrary and not a reflection of underlying preferences (Ariely et al 2003).

- We satisfice and use heuristic rules as a guide to decision making. There are different types of heuristic rules, but such rules are generally consistent with a form of procedural rationality. We compartmentalise decisions. We often substitute simple but less relevant questions for more complex ones (Tversky & Kahneman 1974).

- Even when information exists, we are unable to process that information in the manner assumed in rational expectations models, because of our cognitive limitations. Information processing capacity is limited and the use of this capacity is effortful and costly.

- We may have a model of the economy (or the frame for some decision) in mind, but there is every reason to have little confidence in this model. In addition, we are often aware of our ignorance.

- This ignorance is unavoidable in a world of at best highly subjective expectations and often strongly non-ergodic ones – in the sense defined by Paul Davidson.

The above describes decision makers in most modern Post Keynesian models, and forms the best set of foundations for understanding Keynes, Davidson and Minsky. It is consistent with the complexity economics of Kirman (2011), and the world view of the founders of institutionalism – such as Veblen and Commons; and with the economics of modern monetary theorists (Wray 2012).

It is a description of all that makes decision making interesting, and almost all that makes macro-economic management challenging. Decision making is not simple, and often cannot usefully be reduced to the mathematics of constrained optimisation with simple objectives. Such decisions are Shackle's 'empty decisions' – the decision making of robots – at best, an interesting logical problem to study, and one that is tractable for mathematical analysis. It is, however, an error to see such analysis as being of general relevance to real decision making. Real decision making is complex and creative.

> **"Decision, as all of us use the word, is a cut between past and future, an introduction of an essentially new strand into the emerging pattern of history."**
>
> (Shackle 1961)

This understanding is not consistent with general equilibrium models and the welfare implications of Arrow and Debreu in a competitive general equilibrium. It is not consistent with a view that laissez faire would guarantee some form of welfare optimum in the absence of monopoly power, externalities and public goods, or asymmetric information. Indeed, the very concept of an identifiable 'welfare optimum', which could potentially turn either a set of competitive and complete markets, or an equivalent benevolent social engineer, into a robotic (empty) decision maker is an absurdity.

An economics for real human decision makers must incorporate norms, availability, framing affects, mental accounting, social influences and herding, and must involve scepticism about absolute values (whether for stocks and other assets, or for goods and services) and value in

exchange. Where there are matters of ethical and moral significance at stake (e.g., equity and ecological sustainability), there is less that can be safely left to the market and more that must be social, political decision making. There is less that is technically and technologically determined, and more that is normative and subject to debate and to uncertainty.

Such an economics must allow for the inevitability of instability and the possibility of crisis. Most people who understand economic issues through such a lens will feel that the development of effective instability thwarting mechanisms and safety nets is of greater significance than is generally believed by those steeped in neoclassicism. These issues matter a great deal.

To recapitulate, we have an alternative set of conceptual foundations for economics, and not one which is random and chaotic, but one which is susceptible to theorising based on empiricism and induction. This alternative set is not consistent with the orthodox economics models of the past two centuries – it is consistent with varieties of Post Keynesian and other heterodox economics. Crucially, we also now have a useful framework for discussing such economics in stock-flow consistent models, which we can put up against the mainstream as a viable alternative tool of policy analysis.

Both behavioural economics and Post Keynesian economics can be based on broadly the same decision making foundations. The first explores the meaning of procedural rationality, and the second at least implicitly - and it should be explicitly - incorporates procedural rationality

into its modelling of the economy. Many Post-Keynesians, including Paul Davidson, are well aware of this link.

> **"Keynes's General Theory provided many examples of actual behavior that differed from that predicted by classical theory—the mainstream economics of Keynes's time. This behavior included herd behavior in financial markets, the use of conventions, decisions made under uncertainty that differ from decisions made under probabilistic risk, and so forth. Recent MRI evidence by neural scientists indicates that different parts of the brain are involved when decisions are made under risk conditions (with probabilities of outcomes known) and uncertainty conditions (where no probabilities of outcomes are known). Keynes was the first behavioral scientist!"**
>
> (Davidson 2011, p251)

I will argue that a movement away from 'soft' orthodox substantive rationality, as it is expressed in expected utility theory, to 'hard' Post-Keynesian procedural rationality, which is consistent with modern Prospect Theory and broadly supported by neuro-science, is a natural progression in scientific thought. A move from Real Analysis to Monetary Analysis, from general equilibrium modelling to stock-flow consistent macro modelling, and from substantive to procedural rationality are inter-related and consistent with a Lakatosian movement away from what has become a degenerative research programme towards a progressive one. At the centre of this progressive programme will be modern monetary theory, and a set of implied institutional and policy reforms.

4.5 Cognitive Systems

Before outlining this argument, it is useful to introduce the model of system one and system two thinking. A dual process approach to cognition has long roots in psychology, dating back at least to the late nineteenth century, but the terms 'system one' and 'system two' were first coined by Stanovich and West (2000). The 'systems' go by a variety of other names, and some prefer to use labels such as 'intuitive thinking' and 'deliberative thinking', especially since system one and two do not refer to specific neurological systems. Nonetheless, I will follow Kahneman (2011) in using these terms, which have become widely used and understood.

Table 4.1: Two Cognitive Systems

System One Thinking	***System Two Thinking***
Automatic	Requires engagement
Effortless	Effortful and costly
Parallel	Serial
Involuntary	Can be voluntarily engaged
Associative	Deliberative
Instinctive (fast) thinking	Slow thinking
Cognitive ease	Cognitive strain
Feelings and emotions	Self-control
Prone to biases	Management by exception
Generates beliefs and attitudes	Draws on System 1

Most of our interactions with our environment and other people, and most of the decisions we make every day are performed using system one. This is an automatic, involuntary and effortless system, in that we consciously and unconsciously are making multiple decisions all the time, often unaware that we are doing so.

System one has much in common with our perceptual system, but is capable of associative memory search; looking for similarities and references; using simplified heuristics to facilitate quick and easy decisions; and generating emotions, beliefs and attitudes. System one thinking will often be inconsistent with the substantive rationality postulate of orthodox economics, but this should not be interpreted as evidence of irrationality. When orthodox economists classify a failure to follow the axioms of expected utility theory as irrational behaviour, they are misusing the word 'irrational', or at least using it in a way which is not consistent with its general meaning.

For complex problem solving, we can engage system two. When thinking through complex issues, trying to understand a difficult text, or constructing a logical argument, we engage system two. We engage system two when attempting to maintain arduous exercise or concentrating in a crisis situation. System two can be engaged when system one immediately registers that there is no acceptable quick and easy solution to a decision problem. System two is always involved in decision making, at least in the passive sense of monitoring decisions

made by system one and intervening when there is an obvious gap between the intuitive reasoning of system one and a reasonable answer to a decision problem.

Conversely, system one is also always involved, even in the most complex and deliberative of decisions, as system two must draw on impressions, emotions, attitudes and memories generated in system one.

The theory of cognition and decision making which is taken for granted in orthodox economics requires the use of system two thinking at all times, with the possible exception of decisions taken repeatedly under identical circumstances, where no deliberation is required for maximising behaviour. However, in reality even when we engage system two when making a choice, or resolving a problem, the influence of system one thinking on those factors we take for granted, or the framing of the problem we have unconsciously adopted, means we are still more likely to follow the predictions of psychological Prospect Theory than those of expected utility maximisation.

This two systems model of cognitive processes has been accepted as being of value by economists with a background in neuro-science**:**

> **"The breakthroughs in using neuroscience to do economics will come from simple approaches which model behavior as the interaction of a small number of systems, perhaps only two (which is, to a neuroscientist, grossly oversimplified, but which**

nonetheless might be the right level of abstraction for economics). The challenge is to pick two systems (a neurally plausible dichotomy), or more, and generate precise predictions about the behavior which would result."

(Camerer 2003)

The above is a superficial and incomplete description of the distinction between the intuitive and deliberative approaches to making decisions, as broadly accepted by virtually all the behavioural economists who have contributed towards the study of decision making over the past decade and more.

What is most important is the validity (or otherwise) of the following closely connected points:

- The orthodox theory of expected utility maximisation assumes that sufficient relevant evidence and sufficient cognitive capacity is always available so that deliberative system two thinking can be applied to every decision problem.

- It also assumes that system two analysis will always conform to a specific set axioms, to be discussed below, and to the characteristics of rational decision making outlined above using those axioms.

- It ignores the existence of intuitive system one thought processes or classifies them as irrational and irrelevant to economic analysis (or possibly incapable of being analysed).

- It therefore ignores the approach to perceiving and reacting to most stimuli and choice problems which is pervasive in human behaviour.

- It also ignores the extent to which deliberative thought is influenced by perceptions and intuitions, so that even deliberative decisions will often not lead to the fulfilment of neoclassical postulates regarding rationality.

- It ignores complexity and fundamental uncertainty and the fact that the human brain has evolved to maximise evolutionary fitness in a challenging but locally familiar and in some senses relatively stable environment, but now must react to a highly complex and rapidly evolving one.

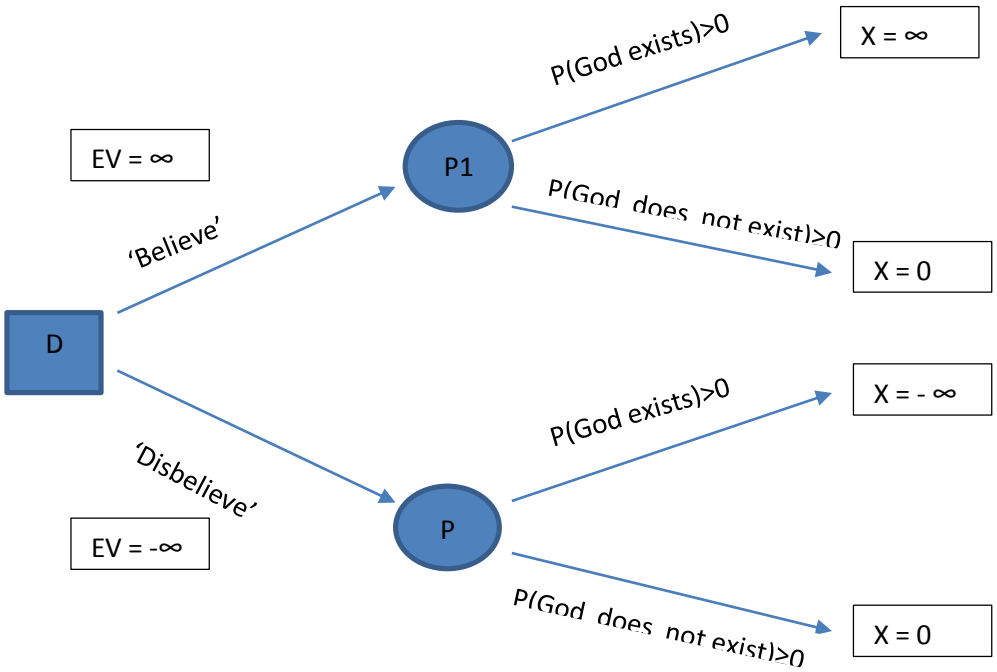
4.6 Orthodox Utility Theory

If we are to reject the orthodox theory of substantive rationality, or build on it, we must first examine where it came from; appreciate the insights it has provided and the contributions of generations of economists to its development and refinement; and describe the main axioms on which it rests. We will then be in a position to describe the best available theory of procedural rationality; to show it to be a superior 'hard' scientific theory; and to describe some of the many insights it provides, and its implications for economics more generally, and for economic policy making.

The historical roots of expected utility theory stretch back beyond not only orthodox neoclassicism itself, but beyond the inception of classical political economy. It is generally agreed that the first normative theory of optimal decision making under risk was devised by the seventeenth century mathematician, Pascal (Bernstein 1996). Pascal developed the notion of expected value, and argued that decision makers ought to choose between risky alternatives (or lotteries) on the basis of their maximum expected value, where expected value is defined as the sum of the possible pay-offs, weighted by their respective probabilities.

He extended this approach beyond decisions with pay-offs which could be quantified in financial terms, as in the famous example of 'The Wager'. In 'The Wager', Pascal examined the decision about whether to believe or not to believe in God. His analysis can be represented in a conventional decision tree diagram.

Figure 4.1: Pascal's *Wager*



Note: EV denotes expected value.

At node D, the decision maker is faced with a choice between two alternatives, with outcomes which can be described as lotteries. The first option is to choose to believe in God. If God exists, the pay-off to this decision is infinite. Should God not exist, there is a zero pay-off. Assuming there is some positive probability of the existence of God, and given that the product of infinity with any positive number (however small) is itself infinity, the expected value of a decision to believe in God is infinite.

The other available choice is to disbelieve in God. If God exists anyway, the pay-off to this choice is negative infinity, while once again there is no pay-off if there is no God. This choice has an expected value of minus infinity.

This implies that the correct decision, based on Pascal's maximum expected value criterion, is to believe in God.

I have reproduced 'The Wager' partly because there are echoes of this analysis from almost 350 years ago in modern neoclassical economics. The idea that belief or non-belief can usefully be examined on the basis of pay-offs and expected values is something which has crept back into economics since Becker and others extended the economic theory of choice beyond what had become its traditional bounds during the 1960s (Iannaccone 1998). Such a basis for an examination of belief/non-belief is, of course, an absurd notion, as anyone other than a subset of neoclassical economists would always have accepted. Belief for most people is a judgement, perhaps culturally determined, perhaps instinctive – but rarely if ever a rational choice. Belief clearly adds to feelings of subjective well-being for many people, but the act of belief itself can never be an optimising choice between alternatives, and is not an expression of a revealed preference.

The general idea of decision making based on maximising expected value was a great advance, and a foundation for the later development of theories of rational choice under risk. Following Pascal, there now existed a normative theory of choice, which could be applied to analyse

decisions taking under probabilistic conditions, and to identify the correct 'rational' decisions to take. It could, therefore, be used to classify other choices as incorrect and in some sense as 'irrational'.

Modern economic models incorporating decision making by 'risk neutral' actors, such as the uncovered interest parity assumption in Dornbusch's model of exchange rate overshooting (1976), continue to use Pascal's method of modelling choice.

What Pascal did not provide was any notion of risk aversion, or indeed a well-defined concept of 'utility' and an associated utility function.

The addition of these concepts is in itself almost enough to describe modern expected utility theory, and once again it was a development which happened very early on. Although challenged and modified, it has been left essentially undisturbed in 'state of the art' neoclassical economics to the present day. It is astonishing that the economic theory of decision making under risk has changed so little. Indeed, like so much else in the neoclassical core, its evolution has been almost entirely circular.

They came early in the eighteenth century, from Daniel Bernoulli (1954 – although see Bernoulli's reference to Cramer on p34), who began his 1738 paper by explaining that a lottery ticket might be worth more to a rich man than to a 'very poor fellow', because the

marginal utility of wealth and therefore the level of risk aversion is lower for the rich man. For this reason, 'all men cannot use the same rule to evaluate the gamble'.

Bernoulli was in part inspired by his cousin Nicholas Bernoulli's so-called St. Petersburg Paradox, which is as we shall see by no means the last so-called paradox of choice to have contributed to the theory of decision making.

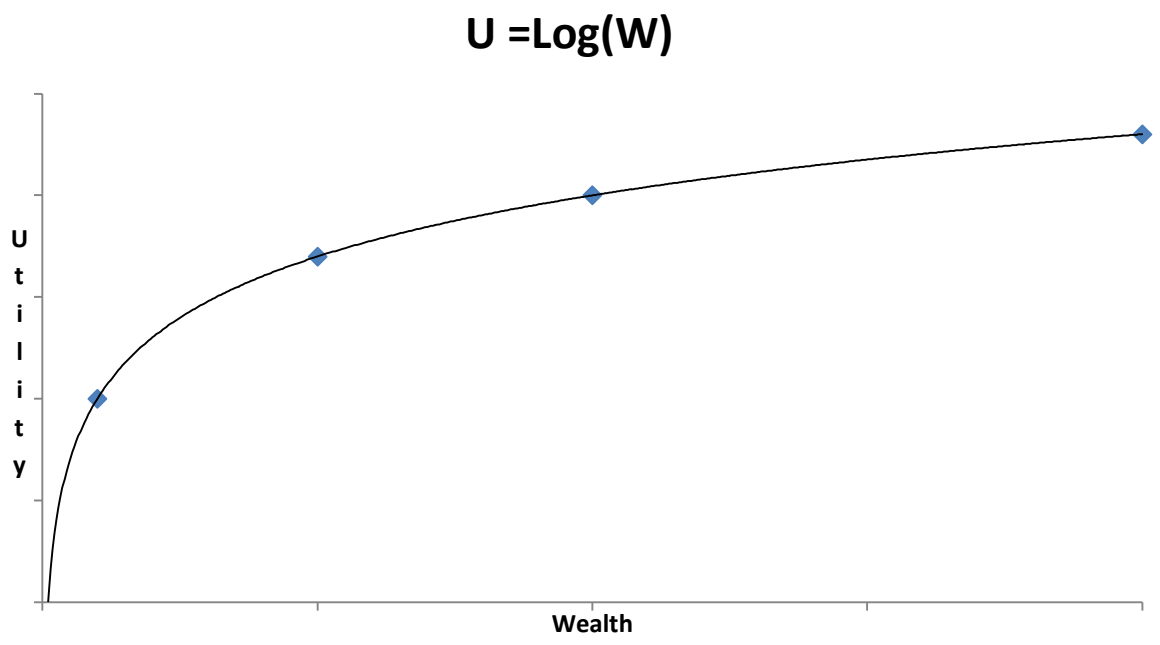
The St Petersburg Paradox relates to a game of chance, involving successive tosses of a fair coin, where: (1) the game ceases once a 'heads' is tossed; and (2) the pay-off from tossing a 'heads' is doubled until a 'heads' is thrown. To use modern and convenient monetary units, rather than Bernouilli's ducats, if the coin is tossed and comes up 'heads' first time, the player wins $2 ducat and that is the end of the game. The expected value (EV) of this outcome is clearly $1 (0.5 x $2). However, if the coin comes up 'tails' on the first toss, then it is tossed again, and if a 'heads' occurs on the second toss, the player receives $4, and this is the end of the game. The EV of this outcome is also $1 (0.5 x 0.5 x $4). Should the coin continue to come up 'tails', then the coin is tossed again, and this continues until the occurrence of a 'heads'. Because on each successive toss, the pay-off to a 'heads' is doubled, the multiplication of the probability by 0.5 is cancelled, leaving the EV of each toss at $1.

Since the game can, in principle continue indefinitely, this implies that the EV of the game to a player is infinite. According to Pascal's maximum EV criterion, a player should be prepared to pay any non-infinite sum for the right to play the game.

No-one, of course, would be prepared to pay more than a few dollars to take part in the St.Petersburg Game – hence the paradox.

Bernoulli attempted to resolve the paradox, and to formalise his statements about the value of an identical lottery to a rich man and a poor man, by developing the notion of utility, or subjective value, separate from, though dependent on, the financial outcome of the game. Bernoulli hypothesised that utility (U) is a non-linear function of wealth (W), with a concave utility function U(W) and consequently a diminishing marginal utility of wealth. This requires a concave utility function. The particular functional form chosen by Bernoulli was the simplest possible logarithmic one, so that U = log (W).

Figure 4.2: Bernoulli's Utility Function



This is not an entirely successful resolution to the Paradox, as can easily be demonstrated by amending the game so that the pay-offs increase exponentially in powers of 10, instead of powers of 2. A base 10 logarithmic utility function combined with pay-offs increasing in powers of 10, returns the game to an outcome where the expected marginal utility of each successive coin toss remains constant, and the game is restored to one of apparently infinite expected value. The only way to overcome this apparent difficulty in the context of expected utility maximisation is to specify that the marginal utility of wealth eventually falls to zero.

Nevertheless, Bernoulli's utility function is as important an innovation of any of those elements of enlightenment thinking which laid the foundations of classical economics. It built an additional layer of complexity onto Pascal's criterion, in order to provide better explanations and potentially better predictions of a wide variety of decisions, taken by rational decision makers under conditions of risk. It also established the notion that rational decision makers should make individual decisions with reference to their total wealth, which was eventually to form part of the basis of Markowitz Portfolio Theory and the modern theory of finance.

It formalised the notion of diminishing marginal utility, which was one of the building blocks of neoclassical microeconomics and general equilibrium. It established the identity between the notion of risk aversion and the degree of concavity of a mathematical utility function. This alone is a major contribution, in that it implies that it is illogical to discuss the form of the utility function and the degree of risk aversion of a decision maker as separate objects – they are one and the same.

However, Bernoulli's utility function could be criticised as being an arbitrary mathematical description of an unobservable and perhaps non-existent variable. It is a cardinal theory of utility, assuming that utilities depend on wealth and can be measured on a cardinal scale using a logarithmic function. Of course, there are a variety of mathematical functions which can be used to describe a concave curve, including power functions, but they could all be seen as arbitrary and selected for analytical convenience, rather than because they are related to a genuinely cardinal measure of utility.

The successful use of power functions to describe firing rates of networks of neurons in response to stimuli, and the extraordinary possibility this has created in terms of providing a neuro-science basis for a form of cardinal utility, is one of the most surprising results provided so far by neuro-scientific research (Glimcher 2011, p 425). However, this is a very recent (and intriguing) discovery.

Pareto and Walras, the neoclassical giants of the Lausanne School in the 1870s, opposed the notion of cardinal utility, as being unscientific. They wanted to replace the 'soft' theory of cardinal utility with a 'hard' economic theory of welfare and choice. For Pareto, a hard theory ought to make no assumptions which were not obviously true (and so include only assumptions which are genuinely 'axiomatic') or which could not be demonstrated to be true. The notion of cardinal utility did not meet this criterion, and, moreover, ran the risk of being used to justify inter-personal comparisons of utility for public policy purposes, when there was no logical basis for such comparisons. Hence, Pareto believed, it should be abandoned.

In its place, came the notion of ordinal utility. Ordinal utility makes the very limited claim that given a choice between two sets of circumstances, a rational individual can consistently tell you which she prefers, or whether she is indifferent between them. It was this limited claim which lay behind the concepts of Pareto optimality and Pareto improvements. A distribution of resources is Pareto optimal if no redistribution could improve the welfare of at least one individual without worsening the welfare of anyone else. A Pareto improvement is when at least one individual is made better off without anyone else being made worse off. When economists discuss 'economic efficiency' they are referring to Pareto optimality, and of potential Pareto improvements. They are therefore thinking in terms of ordinal utility theory.

Just as the Walrasian general equilibrium theory inspired Arrow and Debreu in the development of modern general equilibrium theory, so the Paretian ordinal utility theory inspired Samuelson (1938) in the development of a modern theory of preferences. Like Pareto, Samuelson wanted to avoid making assumptions which were not generally accepted as being true. Samuelson, in his contribution to the theory of consumer behaviour, was, like Pareto, endeavouring to do 'hard' economics. Revealed Preference Theory is the result. It is a description of the consequences of logically consistent decision making by substantively rational and well-informed individuals who aim to obtain the highest possible degree of satisfaction from the choices they make. Consequently, they must make decisions which are mutually consistent.

If we imagine such a decision maker, being faced with two possible consumption bundles of goods – A and B – then the selection of A must imply that B is not preferred to A. A could be

preferred to B, or the individual could be indifferent between A and B, but it would be irrational to select A if B was preferred to A.

For he or she is to obey the axiom of completeness, the individual should be able to state whether he prefers A to B, or B to A, or is indifferent between them, for every possible pair of consumption bundles. For choice to be consistent over time, this revealed preference should remain constant.

Another axiom of revealed preference is transitivity. If we extend the above example to include three consumption bundles, so that the choice is now between A, B and C, transitivity requires that if A is preferred to B and B is preferred to C, then C cannot be preferred to A. This is another required characteristic of logically consistent decision making.

Moreover, the choice between A and B should be independent of the availability of this third option C.

Even though real world decision makers are often unable to articulate preferences between choices; are often inconsistent in their decision making without being aware of it; and have even been observed violating the axiom of transitivity and the above form of independence, Revealed Preference Theory became accepted in economics as a useful descriptive theory of choice, and therefore as a basis for defining rational behaviour when choices are certain and well understood.

In a sense, it turned the theory of decision making upside down. In earlier, cardinal utility, theories of choice, people make decisions because those decisions maximise some measure of utility, which defines their preferences. Preferences determine choice. In revealed preference theory, the options that logically consistent decision makers select define their preferences. Choices determine preferences, at least in a relative or comparative sense. As long as your choices obey the axioms of revealed preference theory, you are behaving as if you are maximising some utility function, even though no measurable concept of utility actually exists.

The revealed preference approach can also, in principle, be applied to decisions under probabilistic conditions – lotteries - by simply regarding lotteries as bundles. Thus a lottery providing a 50% chance of a pay-off of $4000 and a 50% chance of a zero pay-off can be described as Bundle A; and another lottery offering a 45% chance of a pay-off of $5000 and a 55% chance of a zero pay-off can be described as Bundle B. If a decision maker selects B over A, then that decision maker has revealed that she does not prefer A over B.

However, revealed preference theory does not identify that these two gambles are of a similar nature, and is consequently insufficient as a foundations for the neoclassical theory of decision making under risk (Glimcher 2011). These foundations were provided by the Expected Utility Theory of Von Neumann and Morgenstern (1944), essentially by the addition of two additional axioms to those of revealed preference theory. One of these was the technical axiom of continuity of preferences, which in the case of A and B above would imply

that for any such pair of lotteries, it must always be possible to reduce the pay-off to the preferred gamble by a small amount without affecting the optimal decision.

A more important and controversial axiom is that of independence, where the term independence has a different meaning to its use in the context of revealed preference on the previous page. The independence axiom is the assumption that the addition of a common and independent event C to each lottery, A and B, will have no effect on which lottery out of A and B is preferred. If A is preferred to B, then A + C must be preferred to B + C. It is this axiom which effectively restores Bernoulli's theory, without requiring the existence of a concept of utility which is measurable in meaningful units on a cardinal scale.

A decision maker obeying Von Neumann and Morgenstern's axioms would behave as though maximising expected utility when faced with a monotonic utility function, where utility is a function of wealth, even though utility as a concept with meaningful and objective units does not exist. Indeed, by presenting the decision maker with a series of hypothetical gambles, and manipulating the probabilities of the pay-offs within those gambles, it would be possible to identify the functional form of that utility function. This is based on the idea that the probabilities of outcomes must be the weights applied to the utilities of pay-offs, if decision makers behave as expected utility maximisers.

In this way, Von Neumann and Morgenstern re-introduced a form of cardinal utility into economics – albeit one which should never allow for meaningful inter-personal comparisons

of utility. Nor, as a consequence, can it challenge the logic of Pareto's approach to questions of social welfare.

4.7 Anomalies with Orthodoxy

Rationality in this form requires financial decisions taken by decision makers to maximise expected utility, where the expected utility from option j is given by

$$EU_j = \sum_{i=1}^{n} p_i U(x_{ij}) , \qquad (4.1)$$

where p_i is the probability of state of nature *i* occurring, $0 \leq p_i \leq 1$ and $\sum_{i=1}^{n} p_i = 1$.

This implies that choices between alternative lotteries ought not to be disturbed by mathematical operations which logically do not re-order the expected utilities from possible outcomes. Another way of putting this is to say that the addition of a further common lottery to a pair of alternative lotteries should not cause the preferences over them to be re-ordered.

For example, suppose lottery A involves a certain pay-off of $1million of additional wealth, while lottery B involves a 95% chance of $2million of additional wealth and a 5% chance of no additional wealth. If the decision maker's existing wealth is W, then the possible outcomes are given by adding these pay-offs to W:

$$EU(A) = 1.00\,U(W+\$1m) + 0.00U(W)$$

$$EU(B) = 0.95.U(W+\$2m) + 0.05U(W)$$

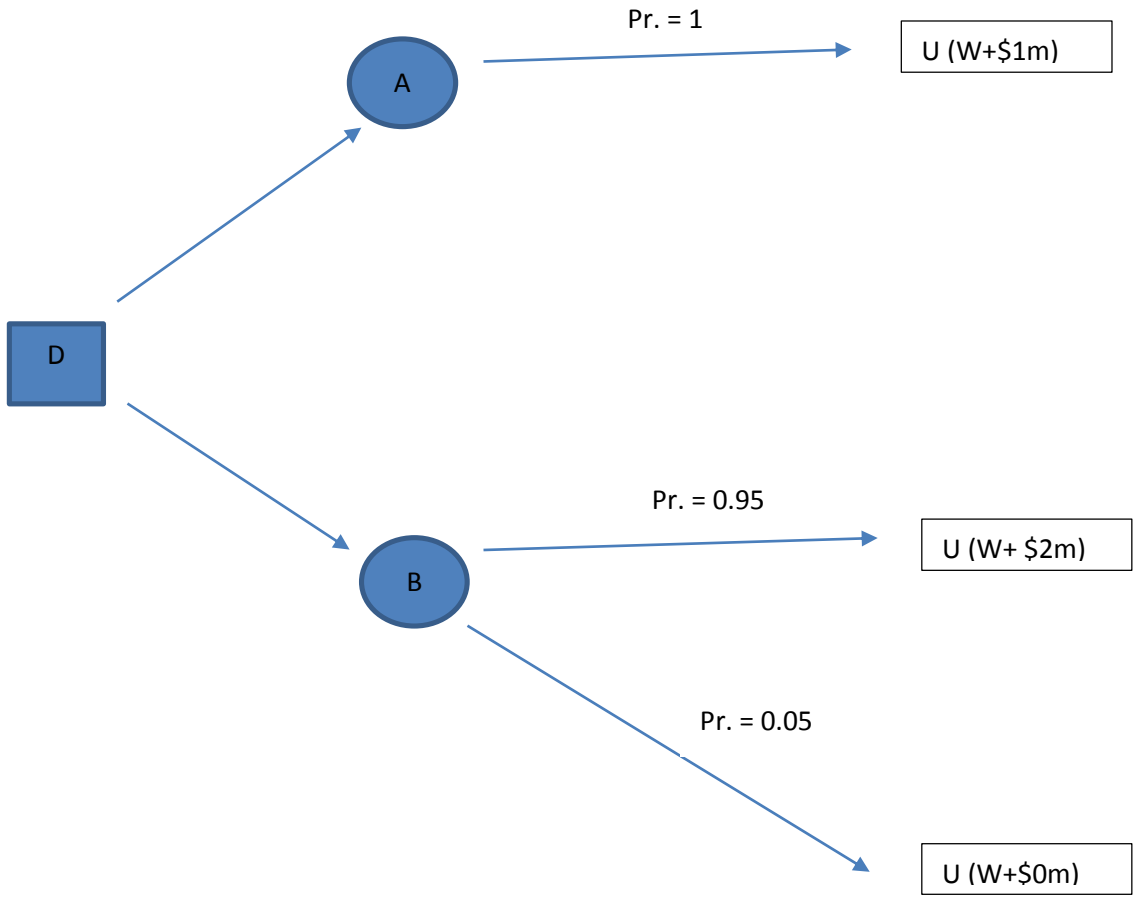
If $EU(A) > EU(B)$, then lottery A is strictly preferred to lottery B. The multiplication of the probabilities of positive pay-offs by the same figure should not change which lottery offers the higher expected utility. Reversing the decision maker's preference between A and B is only possible by violating the independence axiom, which would undermine expected utility theory as a positive theory of decision making under risk. Multiplying the probabilities by 0.01, and denoting the resulting lotteries as A* and B*, the resulting expected utilities are given as follows:

$$EU(A^*) = 0.01U(W+\$1m) + 0.99U(W)$$

$$EU(B^*) = 0.0095U(W+\$2m) + 0.9905U(W)$$

If *EU(A) > EU(B)*, then *EU(A*) > EU(B*)*, because the only difference between the two lotteries is the multiplication of the probability of a positive pay-off by 0.01 in each case.

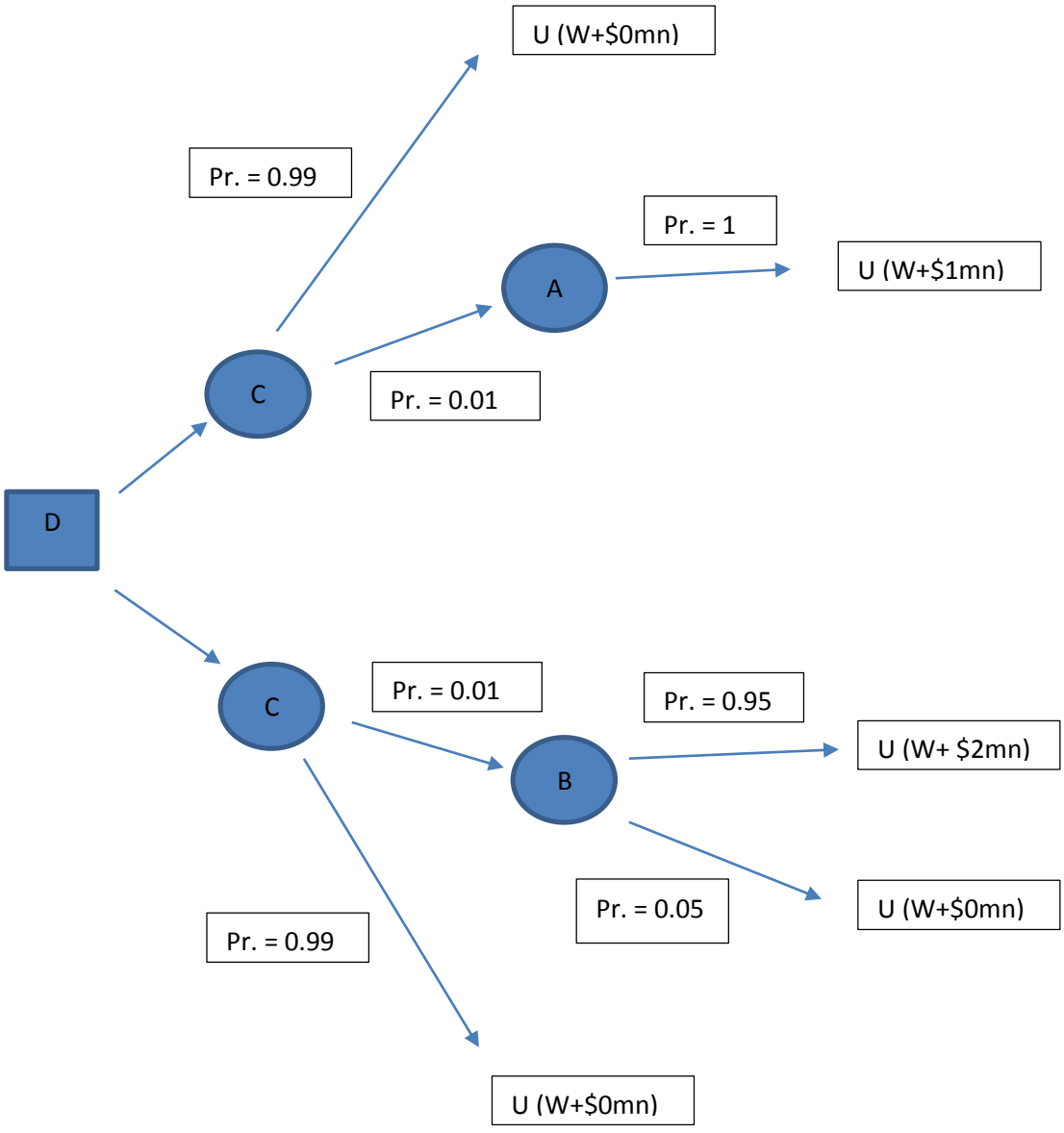
Figure 4.3: Allais' Paradox – Certainty versus Risk



Now, by introducing a common prior lottery C, which is added to both A and B, and where C involves a 1% chance of being able to continue with whichever out of A and B has been selected, it is obvious that A* = A + C and B* = B + C. Since C is common to both, the addition of this common additional lottery, or common ratio, should not logically change a decision

maker's preferences, if that decision maker is 'rational', in the sense of following the axioms of expected utility theory. The ordering of A and B should be independent of this common ratio. The choice of A over B should imply the choice of A + C over B + C.

Figure 4.4: Allais' Paradox – The Common Ratio Effect



Evidence that real decision makers habitually violate the above independence axiom, by switching between A and B in examples such as the above once C is introduced (so that $A > B$, but $B^* > A^*$) was presented by Maurice Allais almost as soon as modern expected utility theory had been devised. Violations such as this 'common ratio effect', and a related 'common consequence effect', became known as the Allais Paradox (1953).

If faced with a choice between A and B, whether the decision is merely a thought experiment, or whether it is being undertaken for real, with significant monetary rewards at stake, the overwhelming majority of people select A. This in itself does not contradict expected utility theory, and could simply imply that the majority of people are sufficiently risk averse to choose a safe pay-off of $1million to a slightly risky pay-off of $2million.

However, when the lotteries have been transformed as described, the majority of people reverse their preferences. Most people prefer B* to A*. Once again, this result on its own is entirely consistent with expected utility theory. This time the prospect of a $2million pay-off rather than $1million more than compensates for the additional level of risk involved.

The reversal of preferences from $A > B$ to $B^* > A^*$ is, however, a significant violation of the independence axiom, and so ought to have inspired economists to move on from expected utility theory to a replacement with greater predictive power.

Examples of the Allais' Paradox have been documented in a wide variety of contexts, and it is supported by a plethora of experimental data. It is also consistent with the way we instinctively react to such hypothetical choices – so much so, that it ought to be accepted as a fact.

An interesting version in the domain of political choice was presented by Quattrone and Tversky (1988). They offered the same set of 88 respondent undergraduate students a hypothetical choice between two potential programs for saving energy costs:

Policy	**Savings in Energy Expenditure**
Program X	$20 million savings with certainty
Program Y	80% chance of $30 million savings; 20% chance of no savings

They also offered the same respondents, with the ordering of the scenarios appropriately shuffled, the choice between two further potential energy saving programs in the state of Gamma:

Policy	**Savings in Energy Expenditure**
Program A	25% chance of $20 million savings; 75% chance of no savings
Program B	20% chance of $30 million savings; 80% chance of no savings

The same 88 respondents made both choices, with the numbers selecting each possible pair of options as follows:

Table 4.2: Data from Quattrone and Tversky's Experiment

Programs	A	B
X	27	38
Y	7	16

Given that A and B involve the multiplication of the positive outcomes from X and Y by the common ratio of 0.25, expected utility theory requires the preference for X over Y to imply a preference for A over B. Yet the combination (X, B) was the modal combination, with almost 73% of respondents choosing X over Y, while more than 61% chose B over A.

These results were inconsistent with expected utility theory at any reasonable level of statistical significance. They were, of course, based on hypothetical rather than real choices. However, as we shall see, a shift from hypothetical or abstract decisions under risk, to real world decisions, despite changing the nature of the Allais' paradox, does not do so in a way which lends support to expected utility theory.

Understanding the Allais Paradox requires an understanding of a variety of stylised facts about decision making by real human beings, which ought not to have been ignored by economists and policy makers.

The first is the importance of certainty and impossibility – what Kahneman and Tversky called 'the certainty effect'. There is something different and special about probabilities of 1 and 0, and particularly where decisions with significant potential pay-offs are concerned. It is easy to state that there must be an evolutionary basis for this, although this is impossible to prove conclusively. Humans are used to highly uncertain environments, and have only in recent times become familiar with quantifiable and objective probabilities. Therefore, even when given such probabilities, and even when decision makers are well trained mathematicians, statisticians or economists, they do not use those probabilities as decision weights when evaluating the outcomes from a lottery.

The Allais Paradox is probably the best known deficiency of expected utility theory as a descriptive theory of choice under risk. The prevailing reaction of most economists at the time the Allais Paradox was first discussed, and for most of the time since, has been to ignore it, and to classify any deviation from the independence axiom, or the other axioms, as inconsistent with rational behaviour, and unacceptable in a well-founded economic model of choice.

A paradox almost as well-known as that of Allais, and just as significant, is the Ellsberg Paradox (Ellsberg 1961). While not relating to a specific axiom within expected utility theory, it is related to the issue of fundamental uncertainty; undermines the subjective version of expected utility theory of Savage; and introduces the notion of ambiguity aversion to the economics of decision making.

The Paradox is usually explained with reference to a game where decision makers face a choice similar to drawing a single ball from one of two urns – A or B. In urn A, there are 50 red balls , 25 blue balls, and 25 yellow balls. In urn B, there are 50 red balls, and another 50, of which some are blue and the remainder yellow.

If a decision maker is offered the opportunity to draw a blue ball from either of the urns, for a prize of $100, then the overwhelming majority of decision makers will choose urn A. Indeed, this often remains the case even when a higher prize is offered should the decision maker choose to select from urn B. For such choices to be consistent with expected utility theory, it must be the case that the decision maker believes there to be fewer than 25 blue balls (and therefore more than 25 yellow balls) in urn B.

However, if without drawing a ball the gamble is changed, so that the decision maker is now offered the prize if a yellow ball is drawn, the decision maker still generally opts for urn A, again even if the prize for making a correct selection from urn B is greater. For this to be

consistent with expected utility theory, the decision maker would have to believe that there are fewer than 25 yellow balls (and therefore more than 25 blue balls) in urn B.

These implied beliefs are not consistent with each other, and consequently the decisions made are inconsistent with expected utility theory. Were we to apply the principle of insufficient reason and to estimate the probability of a blue ball and a yellow ball to be respectively 0.25 and 0.25 in urn B, then when the prize for selections from urn B was raised above the $100 prize associated with urn A, the decision maker should always opt for urn B.

The great majority of decision makers, faced with choices at least partly sharing the characteristics of this simplified example, will select the equivalent to urn A – even when expected pay-offs are equal, or where the expected pay-off to urn B is somewhat higher. This is inconsistent with expected utility theory, which specifies that only the utility of possible pay-offs and their probabilities should matter. It is, however, consistent with ambiguity aversion.

It is also consistent with the approach taken to subjective probability by Keynes, both in his Treatise of Probability (1921) and his later writing, which I mentioned in the previous chapter. For Keynes, decisions taken under subjective risk depend not only on potential pay-offs and subjective probabilities, but also on the weight of evidence indicating the reliability of those estimated probabilities. The more confidence a decision maker has in the subjective probabilities on which a decision is based, the greater the weight given to the associated

outcomes. Hence, new information which might lead a decision maker to revise downwards his best estimate of the probability of a positive pay-off from a decision, but which at the same time increases his confidence in the validity of that estimate of probability, can increase the chance that the decision maker will choose to go ahead with a risky gamble.

Research by Heath and Tversky (1991) has shown that the source of uncertainty is also an important factor in determining whether a decision maker is prepared to take on a gamble, when objective probabilities are unknowable. Specifically, we are comparatively more ready to gamble when we feel confident that we understand the factors determining the odds of success. This 'competency hypothesis' is supported by evidence that people are generally more prepared to gamble on an uncertain positive outcome in an area where they imagine they enjoy expertise and assess a subjective probability, than on a genuinely risky positive outcome where the objective probability of a positive pay-off is set at the same level .

There is no room in subjective expected utility theory for ambiguity aversion, source dependence, or a competency hypothesis of this form.

A further failure of expected utility theory, which has been noted much more recently, is the Rabin Paradox (Rabin 2000). In a sense, this is even simpler than the paradoxes of Allais and Ellsberg, and more devastating to expected utility theory. Rabin's paradox is the observation that decision makers regularly exhibit risk aversion over sums which are so small, relative to their total wealth, as to imply an implausible degree of risk aversion and consequently a utility

function with an implausible level of local concavity. Expected utility theory implies that decision makers with wealth measured in hundreds of thousands or millions of dollars should be virtually risk neutral in gambles which amount to just a few hundred dollars – for the same reason that arcs drawn between two points on vanishingly small segments of a continuous curvilinear function tend towards a linear tangent.

Rabin showed that expected utility maximisers who always turns down 50-50 lose-$100-or-gain-$110 bets will turn down 50-50 bets in which they lose $1,000 or gain any sum of money. Moreover, this is not restricted to a particular functional form of utility function, but is characteristic of all utility functions with a positive but diminishing marginal utility of wealth. It is simply a consequence of the fact that risk aversion over small gambles requires a rapidly diminishing marginal utility of wealth.

The logical consequence is stated by Rabin as follows:

> **"This algebra shows that any attempt to explain attitudes to modest risk aversion in terms of the utility of lifetime wealth would imply a paralysing aversion to risks that everyone finds extremely attractive. It appears safe to conclude that aversion to modest-stakes risk has nothing to do with the diminishing marginal utility of wealth."**
>
> (Rabin 2000, p204)

As Rabin says, to turn down a 50:50 bet of $1,000 versus an infinite amount of money, which clearly has an infinite expected monetary pay-off is such a decision that 'even a *lousy* lawyer could have you declared legally insane for turning down *this* bet'. And yet, it is not commonly seen as insane to turn down an even bet of $100 versus $110. Either it should be, or Rabin has identified with some simple and impeccable algebra, which I have not reproduced here for reasons of space, another reason why expected utility theory cannot be accepted as the final word in the theory of decision making under risk.

4.8 Expected Utility Theory as Non-Science

Expected utility theory, as a predictive theory of choice, and as a basis for anything other than normative and abstract models of a narrowly defined rationality, ought to be discredited. This is not to say that useful insights have not been provided by people using expected utility maximisation, while working within or on the fringes of orthodox economics, but it is to say that when formulating policies designed to further the public interest, we need to do better. The idea that policy proposals derived from models with an axiomatic reliance on expected utility maximisation, should be taken seriously is nonsense.

It is impossible to fit such behaviours into expected utility theory without making such a series of ad hoc adjustments as to place the credibility of the model in severe doubt. It can be done,

but not without rendering the theory, as Anand said, 'not behaviourally testable' and 'immune from empirical falsification' (Anand 1993, p7).

On a philosophical basis, the theory can still be defended as a normative theory of how decision makers with sufficient information and cognitive capacity, always using system two thinking and entirely uninfluenced by system one thinking as is consistent with substantive rationality, ought to behave. It is, after all, a logical theory of optimal decision making, and its axioms boil down to logical coherence and consistency. However, that consistency, taken to an extreme, yields paradoxical results, as we have seen.

This is the foundation of the approach taken by Savage (1954), who is credited with the extension of Von Neumann and Morgenstern's theory beyond lotteries with objective, symbolic probabilities, into the domain of decisions made under subjective probability (SEU).

> **"Although SEU has been, and continues to be, used as a description of how decision-makers behave, it is worth stressing that Savage's version was not intended to be a contribution to empirical science. Rather, he proposed a model that is uncompromisingly philosophical. As an account of what the rational agent must do, it has behavioural content, but it is not behaviourally testable. The postulates of SEU are ideals like the axioms of geometry, although they differ in one rather fundamental respect. Plato's account of the relationship between geometric idealizations and real objects in the physical world does not lead one to suppose that any particular line will have the zero width which geometry makes it useful to assume that lines have. Savage, on the other hand, does expect that real**

decision makers who violate the assumptions of SEU should modify their actions so that they do, literally, conform."

(Anand 1993, p 11)

Orthodox economists, from Savage and Friedman to Lucas and Sargent, can attempt to justify their faith in the validity of expected utility theory by an appeal to quasi-Darwinian and Bayesian arguments – quasi-Darwinian, in that they misunderstand and misrepresent evolutionary processes. In a rapidly changing and uncertain environment, there is no reason to suppose that decision makers who fail to apply expected utility theory in line with the axioms of Von Neumann and Morgenstern will be forced to modify their behaviour, or will even be aware that this is how they in fact behave. The appeal to competitive processes and the survival of the fittest as the basis for enforcing the axioms of expected utility theory in real world decision making has no logical basis in the real world. There are of course exceptions to this, where circumstances are simple to understand and stationary, but our most important economic (and other life) decisions are made under complex and shifting circumstances, where full Bayesian learning of the nature of the environment is impossible. Consequently, we often fail to behave coherently and consistently, even when it would be possible to do so, and as a result are subject to framing effects. Our decisions are not invariant to the way in which decision problems are framed.

Both psychological and neuro-science research confirm that our deliberative processes do not conform to the Bernoulli-Samuelson-Von Neumann-Morgenstern-Savage model, and that such behaviour would not be 'optimal' in the more fundamental sense of evolutionary fitness.

A proper understanding of what it means for a species to exhibit any form of evolutionary fitness (inclusive or otherwise) requires an awareness of the limitations of the human brain, and the extent to which these limitations involve a trade-off between the capabilities of the brain and the cost of carrying an organ which consumes 20% or more of the body's nutrients. Substantive rationality, and the consistent fulfilment of the axioms of expected utility theory in a complex environment, would not be an efficient and sustainable use of the resources available to the human body. The failures of expected utility theory in practice are not therefore surprising, and an approach to them which classifies them as irrationalities is indeed 'uncompromisingly philosophical', to put it mildly.

A further well known problem with expected utility theory arises when attempts are made to explain why the same decision maker in different contexts exhibits behaviour which is often risk averse, but occasionally risk seeking. Were we to accept the axioms of expected utility theory, this would appear to imply a utility function which is both concave and convex, or a marginal utility of wealth which is simultaneously increasing and diminishing.

Such is the Friedman-Savage utility function, which, for a decision maker at or near to an inflection point on a utility function which is concave at lower levels of wealth, but convex at higher levels, can theoretically 'explain' risk aversion over gains and risk seeking over losses, as consistent with expected utility theory. However, the Friedman-Savage function can hardly explain such behaviour by decision makers at widely different levels of wealth, as Markowitz explained almost as soon as modern expected utility theory had been developed and

elucidated (Markowitz 1952a). To explain such behaviour, we need to move on from expected utility theory.

Any 'hard' or 'positive' descriptive theory of decision making and of subjective well-being must provide an explanation for the following pattern of widely observed attitudes to risk:

Table 4.3: The Four-Fold Pattern of Common Attitudes to Risky Prospects

	Gains Relative to Reference Point	Losses Relative to Reference Point
High probability	***Risk aversion (e.g. most investments)***	***Risk seeking (e.g. likely financial ruin)***
Low probability	***Risk seeking (e.g. lotto)***	***Risk aversion (e.g. some insurance)***

It is well known that decision makers almost always exhibit risk aversion when dealing with situations relating to objectively risky gains in wealth, where those gains have a significant probability. This appears consistent with the classical pattern of risk averse behaviour associated with Bernoulli's and Von Neumann and Morgenstern's concave utility functions, and is written into the modern theory of finance (Markowitz 1952b).

Decision makers are also apparently risk averse when insuring against low probability losses, and are prepared to pay a premium which decreases their expected pay-off in order to avoid a small probability of a much greater loss. The 'insurance principle', based on the 'law of the average covariance' (Markowitz 1959), i.e., that many, small uncorrelated risks can be diversified away, allows for a profitable industry to profit from such premiums.

Consistently risk averse behaviour is, of course, consistent with expected utility theory – neither risk premia on financial markets, nor the payment of premia on insurance policies, contradicts the axioms of expected utility theory in any way.

However, it is also known that decision makers commonly exhibit an apparent risk preference when gains have a low but positive probability – particularly in circumstances when it is easy to imagine such an outcome actually occurring, such as a lottery win or a big win at a casino. This can be put down to availability bias, or the over-weighting of events which have a low but non-zero probability by decision makers. It can be related to the Allais Paradox.

There is also evidence that decision makers become risk seekers when reacting to circumstances involving a high probability of loss – such as an entrepreneur taking a decision with a clearly negative expected pay off since it offers a small likelihood of a significant gain, rather than accepting the likely failure of a business enterprise. In finance, this justifies

position limits on traders, to prevent them taking greater and greater risks tin an attempt to avoid booking a known loss.

To explain the set of attitudes to decision making under risk in Table 4.3, it is desirable and perhaps necessary to incorporate mental accounting, reference dependence, loss aversion, and non-linear decision weights into a model. All of these are to be found in Prospect Theory, and all have some support in neuro-scientific research. None of them can be found in expected utility theory.

To reconcile the Rabin Paradox, all that is needed is mental accounting – so that small gambles are habitually evaluated as being separate from total household wealth – reference dependence and loss aversion. To reconcile the Ellsberg Paradox, what is required is a theory which avoids the use of subjective probabilities, independent of the level of confidence in those estimated probabilities, as decision weights. Finally, to reconcile the Allais Paradox, what is required is a theory which is consistent with the over-weighting of low probability events, and the under-weighting of higher probability events, and which is consequently also consistent with the existence of a 'certainty effect'.

Prior to the development of Prospect Theory, which incorporates the above, and can explain the four-quadrant table of attitudes to risky prospects of gains or losses, the prevailing reactions in economics to the flaws in expected utility theory included the following:

- an ignorance that there are any flaws;
- an outright refusal to accept that the flaws are genuine;
- a series of defensive adjustments to accommodate particular paradoxes;
- a resort to defining rationality as equivalent to expected utility maximisation and regarding all else as chaos;
- or a statement that any such anomalies are of no practical importance.

As a direct consequence of the training received by the great majority of economists, the most common of the above was the first one – even now, while no-one can be completely unaware of the progress made by behavioural economics over the past 30 years, it is not uncommon to find young economists who have at no stage been exposed to any of the above. They know almost as little about Kahneman as they do about Minsky.

This explains the attraction of the micro-foundations of modern general equilibrium models, which are based on representative households who at all times practice expected utility maximisation. It helps to explain the dogmatic attitude that any model without such foundations is insufficiently micro-founded, and the consequent view that all macroeconomic analysis must be undertaken within a contemporary general equilibrium framework. I have already discussed how dynamic stochastic general equilibrium models have come to be pervasive in both theoretical and applied macro-economics. I am now in a position to complete that discussion.

The very first equation of such models is as far as anyone needs to go with them. No model which starts by assuming that a household maximises its expected lifetime utility can be taken seriously as a basis for real world economic analysis. The model has ruled out real people by assumption, right at the beginning. This is the 'softest' of economics, and sits well with the rest of the unrealism characteristic of 'real analysis'.

4.9 The Heuristics Approach to Decision Making

To return to the 'hard' economics of decision making and subjective well-being, which needs to be broadly consistent with a realistic monetary analysis of modern capitalism, we need to remind ourselves that both Pareto and Samuelson made progress in utility theory by choosing hard science over soft science. Pareto rejected a cardinal approach to utility theory as being unrealistic. Samuelson attempted to build revealed preference theory on axioms he believed to be broadly realistic descriptions of the basis on which rational individuals make decisions. Doing hard economics means accounting for real people and real institutions. It does not mean the outright rejection of model building, but the building of analytical models based on acceptable and justifiable assumptions, of the type I have already indicated – that is, assumptions based on the exclusion of insignificant complexities, or the potential for the assumptions to be relaxed without significantly changing predictions, or the approximate realism of the assumptions.

Simon's approach to the neoclassical description of rationality, well-being, and choice, was to emphasize both the theoretical strengths and the empirical failings of the neoclassical approach, and to offer concepts such as satisficing, and bounded or procedural rationality as a supplement to neoclassical theory (Simon 1978). It was not until the early 1970s that Tversky and Kahneman (1974) and others built on the work of Simon and others, developing what became known as the 'heuristics and biases' approach to decision making. This approach involved the identification and classification of a variety of common ways in which decision making is observably inconsistent with neoclassical theory. Kahneman (2003) later described his shock at the lack of any empirical basis for expected utility theory, and his earlier work with Tversky can be seen as a reaction to a set of glaring empirical failings in the economics of decision making.

Heuristics which commonly lead to biased judgements include:

- the availability heuristic;
- the anchoring heuristic;
- the substitution heuristic;
- the representativeness heuristic; and
- the conservatism heuristic.

Availability relates to the fact that we tend to overweight possible outcomes which are to the front of our minds. Anchoring relates to our tendency to be influenced by meaningless

information and/or extreme values given to us, and by and the opinions of others, when making judgements under uncertainty. Substitution relates to our tendency to substitute simpler and related but essentially irrelevant questions for questions which are complex in decision making. Although defined in a somewhat different way by Kahneman and Tversky, representativeness has often come to be used to refer to a tendency to draw inappropriate conclusions based on small samples. Conservatism relates to our tendency to dismiss new information which conflicts with our established preconceptions.

Thus: (1) a reluctance to fly following a recent air disaster is an example of availability bias; (2) adjusting your opinions partially towards those of someone whose views you know to be extreme is an example of anchoring bias; (3) buying shares in a company because you like the products the company sells, even when the shares may already be overvalued, is substitution bias; (4) taking a run of price rises in the property market as indicating high future returns on property investments is a form of representativeness bias; and (5) difficulty in objectively assessing a set of ideas which appear inconsistent with preconceptions, is a form of conservatism bias, which is of course related to cognitive dissonance.

This accumulation of anomalies, heuristics and biases, collectively form a refutation of expected utility theory. Any one of the above can potentially be explained away using some ad hoc adjustment to the theory. Collectively, however, they are lethal to it. On any reasonable interpretation of the logic of the scientific method, expected utility theory should now be seen, at best, as a tool limited to those special circumstances under which the evidence against its validity is largely irrelevant or inconsequential. It therefore needs to be

replaced in most contexts in which it is employed. If there is any room left for subjective expected utility theory in economic analysis for reasons of analytical convenience, its use should be limited, and in the full awareness that it is not a realistic description of how human beings go about making decisions.

It cannot be under uncertainty. It is not under subjective probability. It is generally not even under objective risk. Indeed, the idea that we make decisions even under certainty on the basis of maximisation of some form of utility, where utility may be represented as a function of a measure of wealth, must be abandoned.

Abandoning orthodox neoclassical rationality means embracing procedural rationality. Abandoning a fundamentalist axiomatic approach to decision making means embracing an empirical approach to how people actually make decisions. Moving away from a deductive theoretical framework, we are free to embrace an inductive one. A theory built up from observational foundations, if it generates sufficiently generalised insights, is to be preferred to a theory which ignores or makes excuses for contradictory evidence.

We have something better to put in its place. These are the foundations built by Simon, Kahneman and Tversky, Loewenstein and others; and foundations which are more consistent with Keynes, Davidson and Minsky; and which also help to justify Kaleckian microeconomic foundations, Godley and Lavoie's macro-analysis, and the policy prescriptions of today's modern monetary theorists.

The most important building block in these foundations is psychological Prospect Theory:

> **"An essential feature of the present theory is that the carriers of value are changes in wealth or welfare, rather than final states. This assumption is compatible with basic principles of perception and judgement. Our perceptual apparatus is attuned to the evaluation of changes or differences rather than to the evaluation of absolute magnitudes."**
>
> (Kahneman & Tversky, 1979)

4.10 Prospect Theory as a Descriptive Theory of Subjective Value and Choice

Prospect theory is the most significant contribution to the theory of decision making under risk and uncertainty to be developed since Von Neumann and Morgenstern's approach, and should by now have substantially replaced it, at least as a positive theory of choice. It is as great an advance in the economic theory of subjective valuation and decision making, as the advance that the work of Samuelson, Von Neumann and Morgenstern was on that of Bernoulli. As with these earlier advances in economic thought, it involves the addition of a small amount of additional complexity to build on the earlier model, producing a model with superior descriptive and predictive power.

It is the most important contribution to be made by Kahneman and Tversky, collectively, individually, or with other co-authors, and will probably be central to the foundations of a

new economics over the next century. It has unlocked the door to a rich seam of discoveries and insights, relating to loss aversion, status quo bias and the endowment effect, apparently inconsistent risk preferences, apparent money illusion and nominal wage inflexibility downwards, perceptions of fairness and attitudes towards inequality, financial rewards and motivation, the Allais Paradox, the Rabin Paradox, availability and surprise, hedonic adaptation, and human perceptual responses to stimuli such as pain or noise. It is a major element in a developing consilience between neuroscience, psychology and economic analysis in the fields of subjective valuation and decision making.

At the heart of all this is the importance of context, or reference dependence, in decision making and the framing effects, or violations of invariance, that this generates. The theory is also broadly supported by the new science of neuro-economics. Glimsher (2011) discusses a great deal of evidence in support of a neural basis to aspects of Prospect Theory, such as reference dependence (Caplin & Dean 2007) and loss aversion (Tom et. al. 2007).

> **"there are some interesting parallels between the notions of reference dependence in Kahneman and Tversky's formulation and the notion of reference dependence in neurobiology (p288)"**
>
> **"the existence of (a) well-defined (dopamine based) biophysical mechanism for storing the values of actions provides additional support for the hypothesis that a reference-dependent utility shock-driven learning system lies at the heart of human valuation (p377)"**
>
> (Glimsher 2011)

Kahneman and Tversky's 1979 paper introduced the theory, and has since been one of the most cited and influential papers to have been published in an economics journal. It should be a foundation stone for the new, hard economics.

> **"Prospect theory departs from the tradition that assumes the rationality of economic agents; it is proposed as a descriptive, not a normative, theory. The idealised assumption of rationality in economic theory is commonly justified on two grounds: the conviction that only rational behaviour can survive in a competitive environment, and the fear that any treatment that abandons rationality will be chaotic and intractable. Both arguments are questionable. First, the evidence indicates that people can spend a lifetime in a competitive environment without acquiring a general ability to avoid framing effects or to apply linear decision weights. Second, and perhaps more important, the evidence indicates that human choices are orderly, although not always rational in the traditional sense of this word"**
>
> (Tversky & Kahneman 1992, p 317)

In their 1992 paper, Kahneman and Tversky identified 'five major phenomena of choice, which violate the standard (expected utility maximisation) model and set a minimal challenge that must be met by any adequate descriptive theory of choice'. These phenomena are

- *Framing effects***.** This refers to such matters as the reference point used; whether outcomes are characterised as gains or losses (or mixed); the possible cancellation of common factors from the consideration of alternative options; the detection or non-detection of potential violations of stochastic dominance; and the search for simple

heuristics when faced with complex problems, determine the context in which the evaluation of potential outcomes takes place and the decision reached.

- *Nonlinear preferences***.** These preferences render the Allais Paradox non-paradoxical. In expected utility theory, decision weights are considered identical to outcome probabilities, with no 'certainty' or possibility' effects, thereby rendering the effects identified by Allais as anomalous. In Prospect Theory, an S-shaped decision weighting function, which is highly non-linear at very low and very high probabilities, accounts for the effects discovered by Allais.

- *Source dependence.* This refers to an approach to ambiguity aversion, as exemplified by the Ellsberg Paradox, and explained by Heath and Tversky's (1991) observation that the source of uncertainty is important. To wit: 'people often prefer to bet on an event in their area of competence over a matched bet, although the former probability is vague and the latter is clear'. The implications of this discussion broadly conform to the views expressed by Keynes long ago, in the *Treatise on Probability (1921),* that decision weights are not identical to estimated probabilities.

- *Risk seeking* in the domains of highly probable losses and low probability (but substantial) gains. The latter is an example of the 'possibility effect' for highly available but unlikely outcomes. We often prefer to take a gamble on a risk where there is some

hope of avoiding a loss than to accept a certain loss, even when the expected loss from the gamble is greater.

- *Loss aversion***.** This is the asymmetry between losses and gains in mixed gambles, which is at the heart of Prospect Theory. Many insights of the insights derived from it, such as status quo bias and the endowment effect (Kahneman et al. 1991). Through experience, the influence of loss aversion has long been understood by sales staff and marketing professionals, and is now finally and persuasively explained within an economy theory.

A wide variety of theories of choice under risk have been proposed to allow for one or more of these empirical failures of expected utility maximisation. One of them – Quiggin's rank dependent expected utility theory (Quiggin 1982) – has contributed towards an important mathematical advance in Prospect Theory (Kahneman & Tversky 1992), which has allowed for its extension from gambles with a limited number of outcomes and discrete and objective probabilities, to situations of cumulative and subjective probabilities and even ambiguity (Wakker 2010). Shackle's more radical analysis of decision making under radical uncertainty – with its surprise functions, ascendancy functions, and focal points (Shackle 1961), can also be related to Prospect Theory. However, it is Prospect Theory which is the most comprehensive and promising candidate to succeed expected utility theory, as the dominant theory of decision making under risk and uncertainty.

"Much of what we now know would have sounded like science fiction thirty or forty years ago'"

(Kahneman 2011, p 70)

The 1979 paper by Kahneman and Tversky is concerned with decision making under objective risk, with discrete probabilities and a small number of possible outcomes. It addressed the main empirical violations of expected utility theory and provided a theoretical basis for explaining those violations. Their 1992 paper extends Prospect Theory to continuous and subjective probabilities and uncertain outcomes.

According to Prospect Theory, decision making under risk involves: (1) an editing and framing process where we try to make sense of the decision and the alternatives available to us; (2) an assessment of the subjective values of the range of potential outcomes which might arise from each alternative course of action; and (3) a subjective decision weight which (under risk) is a non-linear function of the probability of each potential outcome.

The major innovation is Kahneman and Tversky's, subjective value function (*V*), which plays the role of the utility function in expected utility theory. One important difference between the value and utility functions is that the utility function of neoclassical theory is generally a concave function of total wealth. Substantive rationality in orthodox economics therefore requires an analysis of the probability distribution of the possible outcomes from current decisions on absolute future wealth. A rational decision maker should then calculate the utility of each possible level wealth under the known states of nature, weight these

contingent utilities by their respective probabilities, and calculate expected utility on that basis. The decision which generates the highest expected utility is the rational decision, under this formula. Risk aversion is described by a diminishing marginal utility of total wealth and a resulting degree of concavity in the utility function.

> **"The key elements of this theory are 1) a value function that is concave for gains, convex for losses, and steeper for losses than for gain, and 2) a nonlinear transformation of the probability scale, which overweights small probabilities and underweights moderate and high probabilities'**
>
> (Tversky & Kahneman 1992, pp 297-298)

In Prospect Theory, there is a form of mental accounting which is inconsistent with expected utility maximisation. Decision makers do not habitually forecast the probability distribution of total future wealth when making current investment (or other resource allocation) decisions. Instead, they tend to think narrowly and to compartmentalise decisions.

For example, most people will turn down a 50:50 gamble where the possible outcomes are +$100 and -$100. It is virtually impossible to explain such a decision in terms of expected utility theory. It is such a small increment in wealth that the utility function should be approximately linear over such a small range of *W* (Rabin 2000). It would require an implausibly (and perhaps insanely) high degree of risk aversion to allow for the rational refusal of such a gamble, given its positive expected value, within the confines of expected utility theory.

However, such decisions are easily explained where:

- The decision is taken in isolation from the decision maker's total net wealth ('mental accounting').

- Losses relative to a benchmark or reference point have a stronger psychological impact on the decision maker than gains (a loss of $1 has a greater absolute *V* than a gain of $1).

- The benchmark or reference point in this decision, as in many but not all decisions, is the origin - no gain or loss in wealth.

- There is a diminishing marginal psychological effect to additional gains or losses relative to the reference point, (so the value function is concave in gains V^+ but convex in losses V^-).

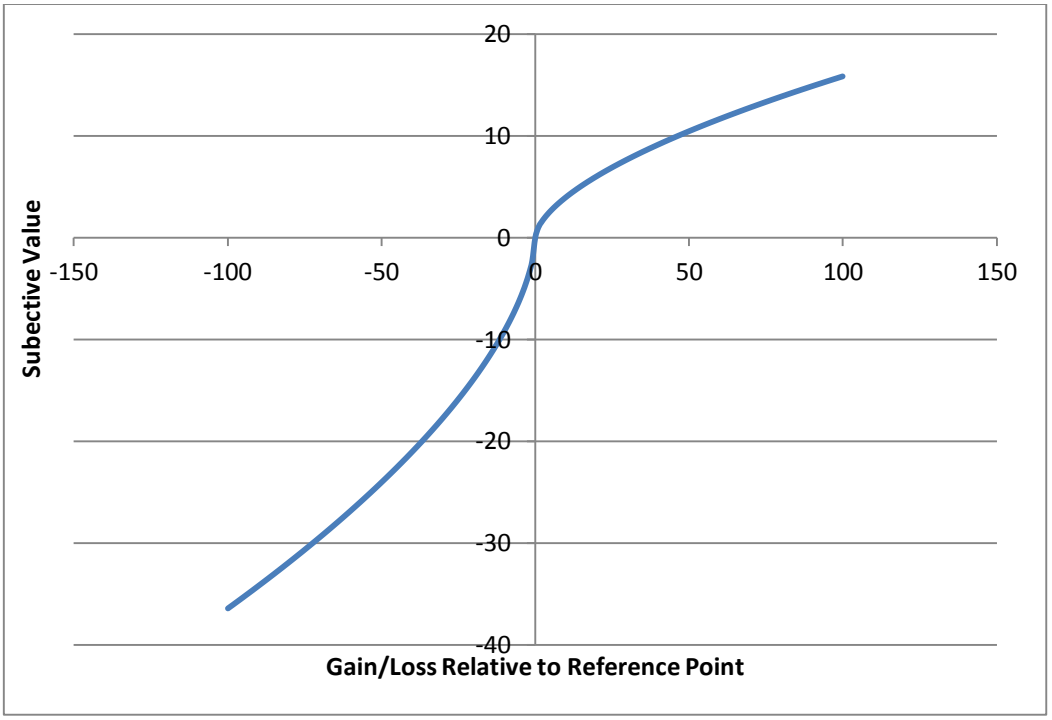
The value function can be described as a two-part power function, and indeed this is the form which appears to be supported by neuro-scientific results:

$$v(x) = x^{\alpha} \; if \; x \geq 0 \qquad (4.2)$$

$$v(x) = -\lambda(-x^{\beta}) if \; x < 0 \qquad (4.3)$$

where x is the deviation from the reference point; $\alpha, \beta < 1$ and λ is the coefficient of loss aversion. There is evidence that the coefficient of loss aversion at the discontinuity at the origin generally lies between 2 and 3. More generally, loss aversion simply implies $v(x) < -v(-x)$.

Figure 4.5: Kahneman and Tversky's Two-Part Subjective Value Function, with $\lambda = 2.3$, and $\alpha = \beta = 0.6$.



Loss aversion of this kind has been so widely demonstrated in small and large gambles, in both experiments and real world studies, that it is no longer a genuine matter for contention, but rather an established fact.

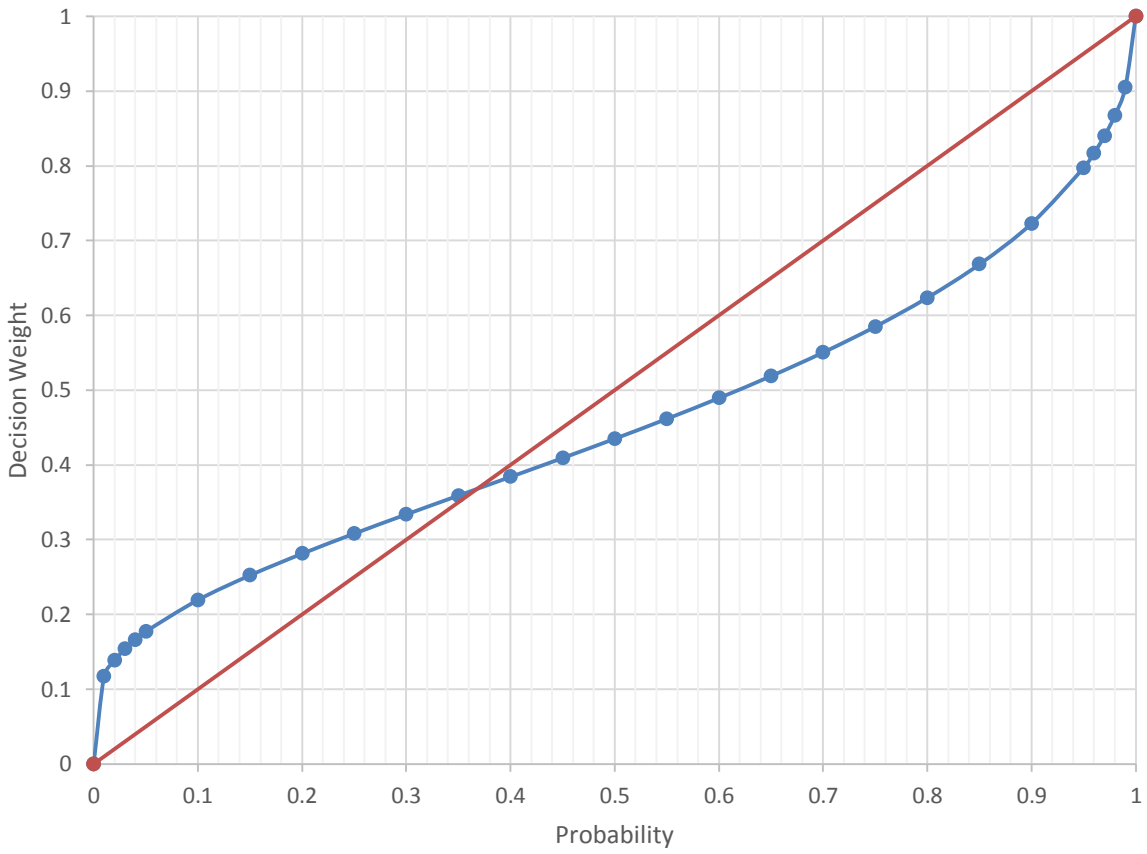
To complete Prospect Theory, a non-linear decision weighting function must be added to the two-part value function. This allows for a form of maximising behaviour, based on the selection of alternative courses of action between prospects through maximising the weighted sum of subjective values (v) of potential outcomes(x), where decision weights (π) are a non-linear function of probabilities (p).

Decisions may then be taken to maximise V, where

$$V = \sum \pi(p)v(x) \qquad (4.4)$$

The weighting function is as shown in Figure 4.6:

Figure 4.6: Decision Weighting Function, Over-weighting Rare Events



$$\gamma = 0.5, \delta = 1$$

In Prospect Theory, low probability events are either given weights which exceed their probabilities, or are virtually ignored, due to a lack of 'availability' during the editing and framing process. Besides making the decision weighting function flexible enough to be difficult to refute, it has the merit of providing a logical explanation for both the over and under-weighting of low probability prospects, and the circumstances under which each will apply. The literature mainly deals with abstract, or symbolically communicated, probabilities,

which are highly available. Under these circumstances, events with low probabilities are overweighted, as in the 1979 paper.

The decision weights for events with higher probabilities consequently underweight these probabilities. The marginal sensitivity of decision weights to small changes in probability is greater than 1 at very low and very high probabilities and less than 1 across some mid-range of probabilities. The weighting function must be concave up to some probability and then convex, and exhibits asymmetry, in the sense that the convex region is larger than the concave region.

The most widely used functional form has two parameters – one of which (γ) determines the curvature of the function; and the other of which (δ) determines the point where it intersects the diagonal (γ, δ >0) (Prelec 1998):

$$\pi(p) = exp[-\delta(-\ln p)^{\gamma}] \qquad (4.5)$$

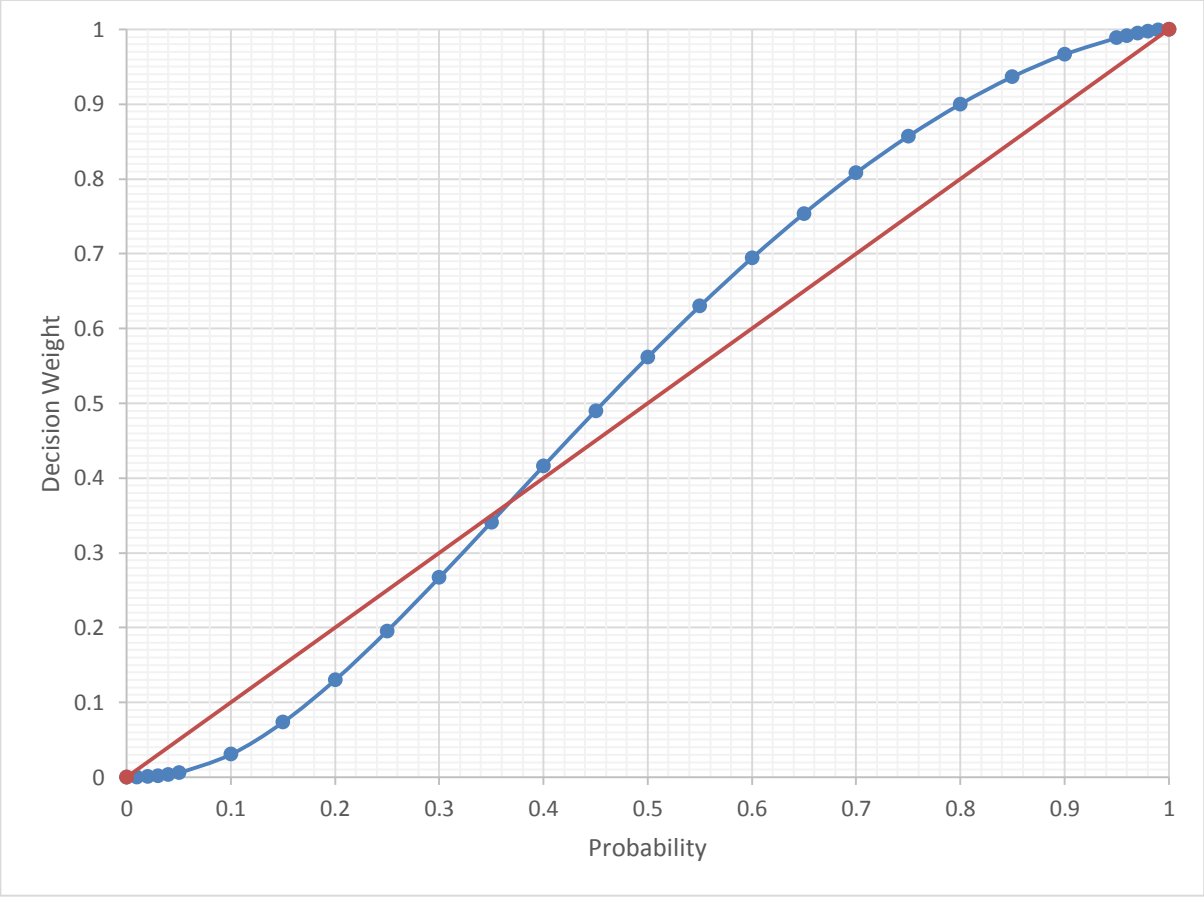
It is often reasonable to assume $\delta = 1$ as an approximation, in which case the point of inflexion from concavity to convexity is also the point where the function intersects the diagonal ($\pi(p) = p$). In this case, the inflexion point occurs at $p = \frac{1}{e} = 0.368$, so that at probabilities below this value, decision weights exceed probabilities, while above it, they are under-weighted.

Increasing the value of γ decreases the extent to which low probability events are over-weighted, with $\gamma = 1$ implying linear decision weights, and $\gamma > 1$ giving underweighting of rare events.

Non-linear decision weights are also apparently supported by neuro-scientific research, although evidence from neuroscience indicates that the form of non-linearity depends on the circumstances. Decisions taken under conditions where in principle people have the opportunity to learn from experience and to forget, appear, based on both the psychological and neuroscientific research related to learning, to be better described by an opposite form of weighting function (Hertwig et al. 2004; Glimsher 2011, p 385), where events which rarely occur are under-weighted, or ignored ($\gamma > 1$).

This is consistent with Kahneman and Tversky's statement that rare events are either over-weighted or ignored, based on their availability, as I have suggested above, and is consequently consistent with a generalised form of Prospect Theory. The underweighting of the likelihood of falling asset prices following a prolonged economic expansion, as Minskian financial fragility develops, and 'stability breeds instability' and there develops a 'radical suspension of disbelief', reflects this form of non-linearity.

Figure 4.7: Decision Weighting Function, during a 'Radical Suspension of Disbelief', when past occurrences of rare events have faded from memory.



$$\gamma = 1.5, \delta = 1$$

The practical importance of the non-linear weighting function is clear. It provides the most convincing theoretical explanation of the Allais Paradox. In association with the two-part value function, it provides an excellent explanation of several long standing 'anomalies' with expected utility theory. Prospect Theory convincingly outperforms expected utility theory as a descriptive theory of choice, and for those of us who accept Simon's definition of what it

means to be rational, the normative definition of Von Neumann and Morgenstern and of Savage can be of only intellectual interest. It has very little practical value, and, indeed, is dangerous as a basis for any economic theory which might be used to generate policy prescriptions, or even inform applied economic analysis.

Why do we rely so heavily on our intuitions in making decisions when probabilities are known or can be estimated at little apparent cost? Why are our intuitions apparently consistently misleading? Why do we make so many apparently avoidable mistakes? Why do we not behave like an optimising decision maker under rational expectations, even on those occasions when such behaviour may be feasible? For what reason is there a 'certainty effect' and an equivalent 'hope effect' at either end of the probability scale? Why do these violations of independence arise, as in the Allais paradox? Why is a change in probability from 0.99 to 1, or from 0 to point 0.01, apparently qualitatively different to any other numerically equivalent change on the probability scale, in that our behaviour is often more elastic to changes in probabilities close to 0 or 1, than over any intermediate range?

It has often been reasonably suggested that the answer to these questions and the source of loss aversion lies in our long process of evolution. Across almost all of our evolutionary history, we have lived in a dangerous, largely unknown, and not understood environment, so that any change or deviation from known routine was an existential threat. Our brains did not evolve to make probabilistic calculations – indeed, the information required to base decisions on such a calculus never existed – and, in important respects, uncertainty was more pervasive.

Safety meant certainty. Risk in the modern sense did not exist, but only uncertainty. This was also an environment where extreme loss aversion conveyed an evolutionary advantage.

Even today, our instinct when confronted with decisions (and especially complex ones) is to be reference dependent and loss averse, and to overweight marginal probabilities close to certain (or nearly certain) outcomes and outcomes that are close to impossible (or nearly impossible). Certainty or impossibility can mean safety and security in a threatening world. Hence we pay to insure against unlikely (but available) events, such as a house fire, to be certain to avoid (very unlikely) catastrophic losses and to make these catastrophic losses impossible (rather than just highly unlikely). To Savage, this is highly risk-averse behaviour. At the same time, we buy a lotto ticket, because our system one thinking distinguishes clearly between the zero possibility of winning (if no ticket is purchased) and the very low but non-zero chance of winning (once the ticket has been purchased). Yet our system one thinking has difficulty distinguishing clearly between different points along the probability scale. To Savage, this is highly risk-seeking behaviour. Then when faced with a life threatening illness (or imminent bankruptcy, if a financial example is preferred), we gamble all on an option with a very low likelihood of a positive outcome, either due to the concavity of our value function for losses, or again because we overweight that low (but non-zero) probability.

The same decision maker in different contexts exhibits apparently highly risk-averse and highly risk-seeking decisions. These decisions are not remotely explicable using expected utility theory, even if we incorporate a Savage-Friedman utility function, as Markowitz was the first to explain. This behaviour is far more explicable within Prospect Theory, in terms of

the value function and the non-linear decision weighting function - indeed, as demonstrated by Kahneman and Tversky (1992), it is possible to generate these outcomes by incorporating a continuous and linear value function with the decision weighting function.

Above all, these decisions/outcomes do not represent irrational behaviour. They represent procedural rationality. They do violate the axioms of rationality as laid down by von Neumann and Morgenstern, and Savage. Such behaviour is defined as irrational by orthodox economists. Hence, they continue to ignore it for most purposes; they omit Prospect Theory from many mainstream microeconomics texts (even today); and they define 'sound microfoundations' in macroeconomics as being based on a decision maker conforming to the axioms of expected utility theory.

From the Savage viewpoint, it might still be defensible to adopt expected utility theory as a description how rational decision makers ought to behave. To do so, however, one must regard human decision making, for the most part, as deviating from rationality. Behavioural economists, therefore, argue that such a definition of rationality is mistaken, since, for most of us, mental accounting and loss aversion are reasonable heuristics to adopt in a complex and uncertain decision environment. They then become cultural, in the sense that we still use the same approach to decisions, even given known probabilities and simple outcomes. In the end, they are simply the way humans make decisions, and are based on the way we have (rationally) come to react psychologically to the outcomes of those decisions.

With this interpretation of Kahneman and Tversky, we are back to Chapter 12 of the General Theory and Keynes – the behavioural economist, to Davidson's explanation of liquidity preference and to Minsky's financial instability theory. We are unquestionably a long way from the efficient markets hypothesis. Conventional behaviour is reference dependent behaviour, with a benchmark which may be related to cultural influences.

4.11 Framing and Perceptions of Fairness and Inequality

The value function referred to above applies very generally to psychological evaluations of changes in states, and, as such, has provided and will continue to provide a wealth of insights. George Loewenstein (2007), among many others, has built on this foundation to provide insights which are of importance if new economics is to be based on a better representation of human behaviour and motivation.

For example, in Loewenstein et al. (1989), the authors published experimental data relating to perceptions of fairness and inequality in different contexts. The results of their research are of great importance in the framing of public debates and policy proposals relating to issues such as equal opportunities and the redistribution of income and wealth. They showed, 'it is not so much *inequality* that people care about, whether advantageous or disadvantageous, but departures from *fairness*' (Loewenstein 2007, p 182).

Outcomes which are understood to be fair become a reference against which potential outcomes can be evaluated. Once this is understood, personal gains and losses relative to the subjectively determined, but generally culturally influenced, fair benchmark are evaluated in a way broadly consistent with the Kahneman and Tversky value function, but with a fascinating variation that depends both on the context of any dispute and on the relationships between disputants.

There were three principal findings in Loewenstein's 1989 paper, all of which were confirmed in later work by Fehr (Fehr & Schmidt 1999), which in turn is referred to in Akerlof and Shiller (2009). They are expressed below:

> **"The first is that, in situations in which an equal split of resources is the norm, people hate coming out behind – a situation we labelled "disadvantageous inequality" The second is that how people feel about coming out ahead – whether they like or dislike it – depends on a wide range of factors, such as the nature of the parties' relationship (whether they like the other person) and the nature of the situation (e.g. whether it is a business transaction or personal interaction). The third is that a major difference between people, when it comes to social preferences is their attitude towards advantageous inequality. Almost everyone dislikes disadvantageous inequality, but there are some people who like advantageous inequality regardless of the situation, some who dislike it regardless, and some who sometimes like and sometimes dislike it, depending on the situation and who they are interacting with."**
>
> (Loewenstein 2007, pp 181-182)

The role of perceived inequities in bargaining contexts, and particularly in the apparently irrational - in the narrow sense- breakdown of negotiations between two parties who both appear to bear losses as a result, has long been understood. So has the willingness of players to make personal sacrifices to punish others for offers deemed to be unfair in ultimatum games. The first sophisticated experimental research in this field was produced by Loewenstein and his colleagues. It was based on what they referred to as 'social utility functions', which turn out to closely resemble Kahneman and Tversky's value function.

The implications of this research are profound, for the following reasons:

- How and to whom we compare ourselves when evaluating the outcome of an event or bargaining process governs our satisfaction or dissatisfaction. Indeed, in a variety of experiments, 'subjects were more concerned with the comparison of their own outcomes with those of the other party than they were with the value of their own outcomes'. (Loewenstein et al., 1989). It is therefore important to note the benchmarking to a relative reference point.

- The extent to which these comparisons are made in a social context or a business and financial context influences our evaluation – particularly of advantageous inequality. *Advantageous inequality is generally seen positively in a business context, but is often (and for severe inequality generally) seen negatively in a social context*. It is also seen (weakly, when in a social context) positively where negative relationships exist

between the decision maker and those against whom comparisons are made. It is seen positively regardless of the relationship setting in a business context.

The analysis of Loewenstein, Thompson and Bazerman is more sophisticated than there is room to reproduce more fully here, including three separate experimental studies and a variety of candidate regression equations, but much can be learned by reproducing Table 3 from their paper and Figures 2 and 3,all of which are based on the first of their three experimental studies.

This study presented a sample of 148 undergraduate psychology and postgraduate business students with scenarios relating to shared gains and losses relating to disputes concerning: (1) a patent application, following an invention with a fellow student; (2) the sharing of a vacant lot (and income or expenses relating to it)with a neighbour; and (3) a business dispute between a customer and a sales manager.

Table 4.4: Lowenstein, Thompson and Bazerman's Experimental Results

Relationship	Dispute type	Disliked disadvantageous inequality (%)	Disliked advantageous inequality (%)
Positive	Invention	92	61
Neutral	Invention	92	55
Negative	Invention	94	42*
Positive	Lot	98	68
Neutral	Lot	100	80
Negative	Lot	98	40*
Positive	Business	94	26*
Neutral	Business	96	27*
Negative	Business	91	27*

Source: Loewenstein et al. 1989, Table 3

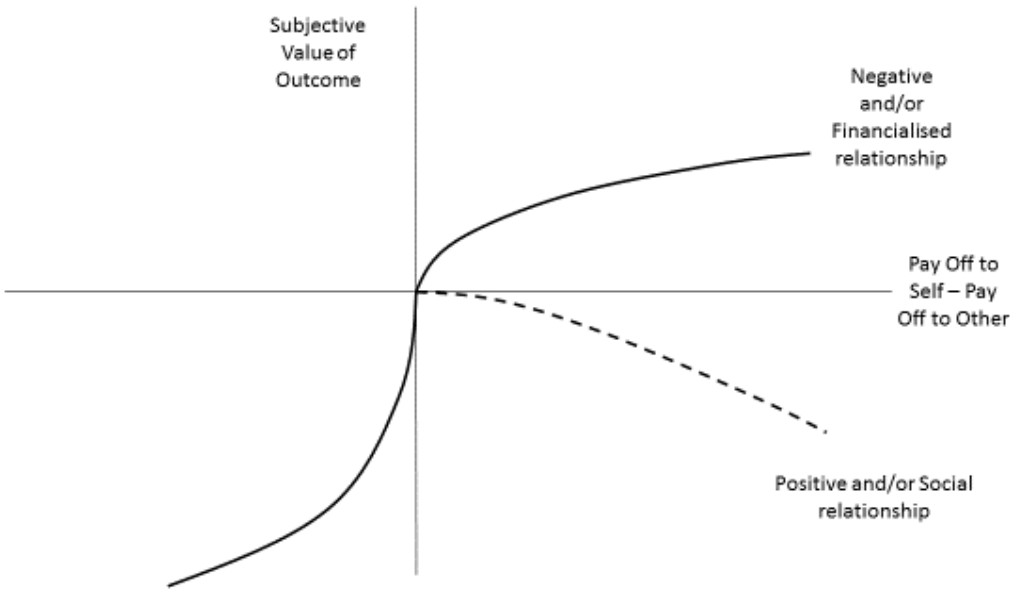
It is the starred results in the final column which are of the most interest, particularly because the conclusions which are drawn from them were supported by the other studies in the same paper, and subsequent studies.

Where advantageous inequality has positive value and disadvantageous inequality negative value, the resulting value function has similar characteristics to the value function in Prospect Theory – with disadvantageous inequality having a greater psychological impact than advantageous inequality (a form of relative loss aversion).

Where advantageous inequality is seen negatively, the resulting value function becomes tent-shaped (see Figure 4.8) – with the peak value at or close to the point of equality of outcome.

It is legitimate for my purposes to simplify these results by conflating the context and interpersonal relationship effects into one variable, governing feelings relating to unequal outcomes. We can then can compare two value functions, on the basis of different attitudes towards advantageous inequality.

Figure 4.8: Value Functions for disadvantageous inequality; advantageous inequality (business dispute; negative relationship); and advantageous inequality (social dispute; positive relationship)



Source: adapted from Loewenstein et al.

Attitudes towards equality and inequality are shaped by the nature of any dispute; the perceptions of other parties and of equitable outcomes; and social norms relating to

what is fair and what is inequitable. In later work (Babcock & Loewenstein, 1997), Loewenstein takes issue with the typical economic analysis of bargaining and presents evidence that bargaining impasses are frequently the result of a self-serving bias in the evaluation by parties of an equitable outcome.

Bargaining problems are often not about optimising, or about asymmetric information and signalling, but differences in perceptions of justice, which constitute differing points of reference. There is evidence that this effect exists even amongst experienced bargainers, such as trade union officials (Thompson & Loewenstein 1992) and lawyers (Eisenberg 1994).

This is an example of an effect which is commonly missed in economists' research on bargaining, because experimental economists tend to gather data by playing repeated games under stable sets of circumstances, where upon players can learn the game and eliminate biases such as self-serving bias. Even those regularly involved in bargaining situations in real life are rarely involved in repeated stable games, explaining the evidence that even professionals are not immune from self-serving bias.

> **"The self-serving bias has other wide-ranging ramifications. Whenever individuals face trade-offs between what is best for themselves and what is morally correct, their perceptions of moral corrections are likely to be biased in the direction of what is best for themselves"**
>
> (Babcock & Loewenstein 1997, p 120)

Loewenstein's work suggests that political outcomes and social institutions are not governed by stable social preferences, but instead that there is at best a simultaneous relationship, and that key exogenous factors shifting the determinants of institutions and attitudes over time may be interest group pressures and effective political organisations. Human nature and social attitudes towards what is fair and how to evaluate inequalities are not fixed over time, but are plastic. We are influenced by evolving social institutions and norms, and of course by other people. There are interesting implications relating to politics, economic reform and social changes over the last 30 years. The shift towards Minsky's 'money manager capitalism' from a mixed economy consensus during that period, has financialised social relationships, and helped to shift attitudes towards the role of government and other social institutions; appropriate tax and welfare systems; and even to superannuation.

Attitudes towards inequality in old age are expected to be influenced by a shift away from social provision and towards private provision via financial investments. Attitudes towards inequality in socially disadvantaged groups are also susceptible to changes in the frame of reference. The more that the disadvantaged can be represented as a separate group from the remainder of taxpayers, who have contributed towards their own relative misfortune (and as such are depicted in an unfavourable light), the more likely attitudes in the community will shift towards the Kahneman and Tversky form of value function in the domain of advantageous inequality and away from the tent shaped value function, where advantageous inequality is, if anything, perceived negatively.

This is the view of Keynes, in his more philosophical writings; of the early institutionalists, who inspired Minsky; and of Minsky's own views on the many possible configurations of capitalism, and its evolution over time. It is also consistent with the views of the anthropologist, David Graeber (2011), some of which I will discuss in my final chapter.

In Minsky's view, only some configurations of institutions and attitudes allow for periods of relative prosperity, full employment, low inflation, and financial stability. The research of these psychologists implies that attitudes, as well as institutions, are plastic and evolving, and can be shaped over time. Whether attitudes and social cohesion allow for relatively stable macroeconomic outcomes depends on perceptions of fairness and bargaining. For example, there was a general acceptance in the 1950s and 1960s of the fairness of increases in real wages in line with rising labour productivity, and the maintenance of aggregate demand to allow tight full employment, and decreasing income and wealth inequalities.

This broke down during the inflationary and stagflationary years of the 1970s, and the mass unemployment years of the 1980s. Accelerating globalisation, deindustrialisation, persistent underemployment, decreasing union power, and other factors allowed for a period of apparent stability against the background of growing Minskian instability from the early 1990s. This was initially based on a shift in bargaining power from labour to capital, but eventually buttressed by an induced change in perceptions of fairness and of the social evaluation value of unequal economic outcomes. Attitudes amongst the majority have shifted, though perhaps not in a way which will prove to be sustainable.

One of the greatest intellectual influences on a young Hyman Minsky was the Chicago institutional economist Henry Simons, whose argument that *'an enterprise economy tends to generate a distribution of income and wealth that is inconsistent with the continuation of political democracy'* (Minsky 2013 (1968), p30) seemed 'particularly timely' to Minsky nearly half a century ago. Shifting attitudes and institutions have increased income and wealth inequality in the USA and elsewhere dramatically since then. The institutional and policy arrangements which have allowed for this are now under question, and the glaring deficiencies in the orthodox economic theory used as a basis for advice to policy makers is of special importance.

We are a long way now from the isolated lifetime expected utility maximiser of neoclassical economics, with his utility in each period depending on his own consumption and his lifetime utility being a function of his wealth and his stable preferences. We can try to include altruism in his utility function, but we won't get far by doing that – altruism itself is plastic with respect to circumstances, relationships, and time. We have to start thinking of him as a social animal, with plastic and shifting preferences, influencing and influenced by other people and social institutions; all against a background of an uncertain and changing environment, and a continuing need to make decisions in this context. Amongst these shifting preferences and influences is his concern for the relative welfare of others, and a concern for equity. This concern for equity reflects current social norms, which have evolved over time and will continue to evolve in the future.

The study of brain plasticity by neuroscientists is another recent and, for a long time, highly controversial area of scientific progress. It is most often popularly discussed in the context of recoveries from severe brain injury, based on the ability of the human brain to adapt to injury and to shift brain maps over time. One discovery which is consistent with the above is that our thoughts, attitudes, and beliefs tend to get established and become more entrenched as a result of the simultaneous firing of sets of neurons associated with particular patterns of thought. The saying is that 'neurons which fire together, wire together'. The connections between these neurons become stronger as a result of shared electrical activity and neuro-chemical signals. Consequently, our attitudes can form and harden. The brain map, however, is continuously changing throughout life. Contrary to what used to be believed, changes are not confined to when we are young, albeit this is when brain plasticity is at its height (Doidge 2007).

When thoughts and attitudes become entrenched, it may require a highly salient observation or set of observations to break some of these neural connections and establish others in their place. What psychologists call 'cognitive dissonance' – the problem of holding two apparently contradictory views at once – makes changes difficult to achieve. It contributes to conservatism bias. However, over time, the brain map does evolve, and if old attitudes and ideas are regularly contradicted, we can change our beliefs.

The economy and its institutions can be changed, but so can social attitudes, and, to a greater extent than most have imagined, human nature and subjective preferences.

"The equilibrium states of the economy may therefore contain a large arbitrary component, created by historical accident or deliberate manipulation"

(Ariely, Loewenstein & Prelec 2003).

The evolving 'non-equilibrium' state of the economy at any point in time is surely subject to 'deliberate manipulation', and to the often unforeseen consequences of that manipulation. Hysteresis, cumulative causation and path dependence are all ways of referring to the role of 'historical accident' in influencing today's economic structure. The 'invisible hand' of the free market is a highly arbitrary and random force for the allocation and employment of social resources, and there is no reason to suppose that under any circumstances it will lead to outcomes which can be defined as socially optimal.

I have now cited and explained the roots of the orthodox neoclassical theory of subjective value and decision making. I have examined a great deal of evidence to suggest that these roots are inaccurate, misleading, or at least inadequate as a guide to understanding real human behaviour; designing economic institutions; and formulating economic policies. I have demonstrated that a superior theory – Prospect Theory –outperforms expected utility theory in economic analysis. It ought to have substantially displaced expected utility theory as a descriptive theory by now. In so far as space has allowed, I have suggested that this theoretical advance is supported not only by a consilience between economics and psychology, but also by a rapidly accumulating body of evidence from modern neuro-science, much of which has been acquired within the last few years.

Yet expected utility theory continues to be built in to the inviolable core, in the very first equation, of orthodox dynamic stochastic general equilibrium models. Always and virtually everywhere in modern macroeconomics, you see essentially the same initial equation (equation 2.1 from chapter two). It continues to form the largely unquestioned base of the whole family of orthodox models.

The Von Neumann and Morgenstern axioms and all they imply are taken for granted by most economists. It is as though there are no anomalies or inconsistencies worth worrying about, and no alternative frame within which to understand decision making.

These are the neoclassical micro-foundations of orthodox macroeconomics. That they need to be challenged is obvious. That they ought to be removed, I suggest, is strongly supported by a great deal of evidence. The removal of these micro-foundations, and their replacement with a more empirically justified approach to understanding and interpreting economic issues, and of formulating and selecting economic policies, is a proposition this thesis is intended to support.

> **"A graduate student in a typical American or European university studying the subject of macroeconomics would be taught that the macro-economy can be represented by representative consumers and firms who continuously optimise a multi-period plan, and in order to do so, use all the available information including**

the one embedded in the model. These consumers and firms not only perfectly understand the complex intricacies and workings of the economy, they also know the statistical distributions of all the shocks that can hit the economy. As a result, they can make scientifically grounded probabilistic statements about all future shocks. In this world of God-like creatures, there is no uncertainty, there is only risk. Coordination failures do not occur because representative agents internalise all possible externalities. Bankruptcies of firms and consumers are impossible. Bubbles and crashes cannot occur because rational agents using all available information would never allow this to happen. Prolonged unemployment is impossible except when consumers choose to take more leisure."

(De Grauwe 2010a, pp 157-158).

Although De Grauwe's reference is to graduate level economics, the real damage is done long before – in the first principles class, where there is commonly an unquestioning acceptance of neoclassical micro and macroeconomics, tempered only with discussions of those market failures which can be made consistent with the neoclassical model. There is little or no discussion which is consistent with real and empirically verified consumer and business behaviour.

From the perspective of macroeconomic policy formation, Prospect Theory and the other advances in behavioural economics, have potentially transformational implications for issues such as employment and unemployment, social attitudes and institutions, fiscal policy and economic efficiency. They are inconsistent with orthodox models, natural rate reasoning, the foundations of dynamic stochastic general equilibrium models, the modern practice of

monetary and fiscal policy, and the associated forms of financial and other deregulation, and government disinvolvement in the economy.

Over the short to medium term, social and institutional factors can provide a background which masks the deficiencies of orthodox theory, due to observational equivalence. This happened from 1945-75 and 1990-2007. However, in the long run, and even when making historical comparisons between these periods, it becomes clear that a combination of Minsky's focus on balance sheets, Kahneman's work on decision making and subjective value functions, and the work of modern monetary theorists on updating Lerner's functional finance view of fiscal policy and sectoral imbalances, provide a superior guide to economic management.

The remaining chapters of my thesis therefore leave the soft economics of utility theory and general equilibrium behind, and outline the elements of a hard economics that deals with real people, and real institutions and markets. It allows for the formation of economic policies designed to provide the great majority of people with a better chance of a sustainable and secure sense of well-being.

Chapter Five

Monetary Fundamentals

"Our knowledge of the monetary systems in primitive and early societies is necessarily somewhat sketchy. Nevertheless I believe that the consensus among historians and anthropologists is that money developed as a social (and governmental) artefact, rather than as a mechanism for reducing transactions costs in private-sector markets."

(Goodhart 2009, p 828)

5.1 What Mitchell Innes Called 'Adam Smith's Error'.

I have maintained that it is inappropriate to consider a macro-economy as a general equilibrium system. The economy is instead a complex and evolving disequilibrium system, albeit one which is constrained in its instability by cultural and institutional factors. The foundations of a useful macroeconomics must allow for this, and must be based on a proper understanding of human behaviour and motivation; of fundamental uncertainty and social complexity; of financial markets and institutions; and of a more general institutional framework.

I have argued that the responsibilities of government in designing and implementing effective instability thwarting mechanisms cannot legitimately be avoided by references to a mystical invisible hand and mythical free and competitive markets, operating in an institutional vacuum, populated by optimising, self-seeking, well informed representative agents, generating outcomes which only differ from an ideal of allocative efficiency because of a series of frictions and externalities.

Contrary to the orthodox view, the economy has no tendency to revert to a full employment equilibrium. There is no natural level of output, no natural rate of unemployment, and no natural real (or nominal) rate of interest. There never has been. These concepts are outcomes of 'soft' economic reasoning, based on unrealistic axioms, with their roots in a core, artisan, barter model.

The various incarnations of the neoclassical model of the economy, and its roots in classical economics, are for the most part logically consistent, although even this is not entirely true. More importantly, they have always been misleading and sometimes disastrous when applied to understanding the operations of complex capitalist economic systems.

This was true of pre-Keynesian economics, and has been true of those who came after Keynes, and subsequently either: (1) rejected discretionary stabilisation policies – monetarists (old and new), or real business cycle theorists; or (2) accepted some form of more or less

discretionary fine tuning – as, respectively, Neo-Keynesians or New-Keynesians, of the first and second neoclassical synthesis.

An important and enduring element of neoclassical economics, which has helped to facilitate the general equilibrium approach and mislead generations, is a misunderstanding of the fundamental nature of money; of its historical origins; and its relationship to debt.

This permitted the acceptance for most of the last century by many leading economists of the quantity theory of money; the banking multiplier; the notion of an exogenous money supply, which could be controlled by a skilled central bank and used as a stabilising intermediate policy target; and the loanable funds theory of interest rates.

It led to a confusion between fiscal and monetary policy operations; a misunderstanding of the operational constraints on monetary sovereign governments; a failure to grasp the significance of one nation-one currency monetary sovereignty; and a consequent confusion and stubborn refusal to face facts relating to monetary theory and fiscal policy.

Worst of all, to an economist like Godley, it encouraged the application of economic models which are not genuinely stock-flow consistent, and which consequently are misleading, in that they do not provide any warning of impending financial fragility or appropriate guidance as to the appropriate response to a financial crisis.

The beginnings of all this are very difficult for most orthodox neoclassical economists to perceive without severe cognitive dissonance. They go back a long way, further than Adam Smith, but it is perhaps with Smith, as the founder of modern political economy, that we should start.

It was Smith who produced an influential description of a logical process whereby money might logically have been developed in early societies. He told the story of early barter systems of exchange, driven by a human propensity to 'truck and barter', but limited by the transactions costs of such a system. Every economics student is taught about the double coincidence of wants problem under barter, the difficulties of trading in high value items which are indivisible into small units, and the time spent negotiating bilateral rates of exchange in a barter system with a generally accepted unit of account or medium of exchange.

Logically, one or more of the commodities traded in such a barter system might evolve to become generally acceptable as a means of exchange for the other commodities traded in the system. This item should be generally accepted as having value in exchange; in addition, it should ideally be portable, durable, divisible, scarce in supply, and homogeneous in value. This *commodity money* would then resolve the problems of a barter system, and facilitate an increasing degree of specialisation and division of labour in growing markets. Commodity money, in this story, is amongst the most important inventions in human history – but barter markets came first. The human propensity to 'truck and barter' is innate. Money and markets

are private inventions, and do not require governmental institutions to develop. They evolve naturally. This widely believed story is a myth.

It is true that a wide variety of commodities have been used as monetary assets in different places at different points in time, including various agricultural commodities and other items of less obvious intrinsic value, like shells, or even gold and silver. The story goes that silver or gold were eventually identified as the most efficient commodities to use as money, and that soon the inconvenience of dealing with 'rude bars' of metal led to the development of standardised coinage, which was quickly monopolised by governments.

This was the story Smith told, and later Jevons (1875) ossified into economics text-books. We can of course complete the received orthodox story, by having these coins deposited in early banking institutions, which in return created paper receipts that came to be accepted as money. The next step involves the development of central banks, issuing paper money on behalf of governments, but paper money that was still convertible into precious metals.

The next stage is the development of modern fractional reserve banking alongside modern capitalism, enabling the bank deposits to expand by a large multiple of the central bank money or gold on which they were based. This is supposedly the very late stage at which debt enters the story as a significant feature of the economy.

The final step is the elimination of the commitment to back paper money with gold or other precious metals, culminating in the abandonment of the convertibility of the US dollar in August 1971, and modern fiat money.

This is the story of money, as it can be found in the majority of economics and macroeconomics textbooks throughout the history of the discipline. It is a story believed to be factually correct, or at least consistent with the available historical evidence, by most academic and professional economists, as well as the overwhelming majority of all those who have ever studied economics, from 1776 to the time of writing.

And yet, there are large parts of the above story for which no evidence exists, and which were the invention of Adam Smith, or, if not him, those earlier writers, as far back as Aristotle, who considered how money must logically have sprung into existence.

> **"For centuries now, explorers have been trying to find this fabled land of barter – none with success."**
>
> (Graeber 2011, p 29)

It is worth repeating, from my first chapter, the quote Graeber takes from 'the definitive anthropological work on barter', by Caroline Humphries: *'No example of a barter economy, pure and simple, has ever been described, let alone the emergence from it of money'* (p29).

The standard story of the development of money has been undermined, at its very beginning. This is not the only part of the story which there is good cause to reject or to qualify, but it is the right place to begin.

The truth about the non-existence of pre-monetary barter systems has been known for many years, including by Innes (1913), Knapp (1924), and Keynes (1930). Yet it has been ignored by many of those who were aware of it, and viewed as either inconvenient or perhaps irrelevant, and has remained unknown to those of us who never had cause to question what we were being taught. The great majority of university lecturers in economics have no idea of how this thing called 'money' to which in a variety of contexts they often refer came into existence.

There must obviously be a good deal of uncertainty as to the details of early monetary history, but of one thing it seems we can be sure, and that is that Smith, Jevons, and a long list of text-books published over many years have been, on a vital issue, completely wrong.

This includes texts published by a long line of prominent economists, but it extends to almost all text-book authors, including, I regret to say, me (Hail 1989, p10).

> **"On one thing the experts on primitive money all agree, and this vital agreement transcends their minor differences. Their common belief backed up by the overwhelming tangible evidence of actual types of primitive moneys from all over**

the ancient world and from the archaeological, literary and linguistic evidence of the ancient world, is that barter was not the main factor in the origins and earliest development of money."

(Davies 1994, p 23)

It is worth dealing with two inter-related issues at this point; firstly, a consideration of some of the reasons for the continuance of known fallacies in leading textbooks; and secondly, the identification of some of the reasons why this falsehood has contributed to other misleading assumptions and conclusions in neoclassical thought.

Adam Smith believed in an idealised 'natural course process' of economic prosperity, driven by man's propensity to 'truck, barter and exchange', necessarily leading to the evolution of money from barter, that allowed for the greater division of labour (Kerr 1993). Money and markets had developed as part of this natural process, and were not to be seen as the creation of governments, or of other forms of human authority.

Consequently, governments and other authorities cannot, in the traditional mainstream story, be the causal factor for the development of markets, money, and specialisation. This is despite the weight of historical evidence that suggests that governments or temple authorities did indeed play this role. More generally, some form of political and/or religious leadership and authority seems to have been central to the development of markets and money everywhere.

Smith, like modern day economists, viewed ancient history partly through the prism of the culture with which he was familiar, and partly in a way most consistent with his normative view of how human nature and society ought to be organised – that is, with metallic money of intrinsic value, and without a reliance on debt, or chartal government money. This combines well with the methodological individualism of economics since Smith, and the rules of optimising behaviour developed and applied by neoclassicals like Jevons, which eventually formed the basis of general equilibrium and New Keynesian macroeconomics. There is a logical consistency through all this, but not a historical reality.

Traditional societies have survived into modern times in some parts of the world, and have been studied in depth by anthropologists. The available evidence suggests that ancient, pre-monetary societies had more in common with these traditional societies which survived at least into the twentieth century, than with modern monetary economies.

These societies were organised as what Graeber describes as 'human economies' or 'gift economies'. Graeber provocatively uses the term 'baseline communism' in this context. There was a form of communal living, often within groups governed by the oldest man. Graeber refers extensively to the Tiv and Lele peoples of West Africa, both of whom were subject to detailed studies in the middle of the last century.

Within these societies and ancient traditional societies, people did not trade in the sense that economists use the term. Everyday items were shared amongst the group, and it would

typically have been unthinkable to deny a request from a group member for food or other basic necessities.

Other items, viewed as symbols of real wealth, would not be freely shared, however. Instead, they would be used as gifts, including gifts to and from elders and sometimes elaborate networks of gifts between group members, for ceremonial purposes in marriages, and to settle disputes or pay compensation arising from injury or murder.

> **"There are innumerable studies of, say, the use of cattle as money in eastern or southern Africa, of shell money in the Americas (wampum being the most famous example) or Papua New Guinea, bead money, feather money, the use of iron rings, cowries, spondylus shells, brass woods, or woodpecker scalps. The reason this literature tends to be ignored by economists is simple: "primitive currencies" of this sort are only rarely used to buy and sell things, and even when they are, never primarily to buy and sell everyday items such as chickens or eggs or shoes or potatoes. Rather than being employed to acquire things, they are mainly used to rearrange relations between people."**
>
> (Graeber, p 60)

It is worth noting how the historical evidence undermines the view that human nature can best be understood as the pursuit of individual self-interest, in isolation from the social and institutional context of decision making.

Echoes of the communalism of traditional societies are of course part of our everyday lives. When you make a gift to a close friend or a family member, or buy them a meal, or do them a favour, you do not generally expect a financial return. Indeed, a newspaper story of a pair of academic economists, who when asked to assist their friends in moving house, chose instead to provide money to pay for professional movers, naturally attracted mockery, and perhaps even contempt (Lahart 2010).

It is as though these people don't understand the significance of communality in inter-personal relations, or how the intrusion of money and exchange in this sphere tends to undermine that communality and lead to separation and individualism. Those economists who habitually engage in such behaviour generally justify it as the logical consequence of their education, and have the normative view that everyone should act in such an 'optimising' manner. The great majority of neoclassical economists agree in principle, but feel discomfort with this behaviour in practice, even though it is strictly consistent with how they model human behaviour. It is clearly not consistent with actual human nature as it has evolved, however, which is why it appears autistic to anyone lacking in the Ricardian quality of thinking consistently within a patently unrealistic model of the world.

In the neoclassical world of opportunity costs and supposedly rational, individualistic and efficient decision making, such a monetary payment makes perfect sense. In the real world, where our lives are based on an instinctive communalism on such occasions, the intrusion of money and economic reasoning in this context feels inappropriate and tasteless. Even though

the money payment was itself a gift, the very act of valuing your time financially in the context of a friendship seems absurd.

In the same way, the exchange of a primitive and gift form of money for a basic necessity with a group member would have seemed inappropriate to someone used to a 'human economy'.

Thus what are sometimes referred to as early forms of money (including by Davies 2010), generally were perhaps not money at all - at least in the sense of a medium of exchange, or a resolution of apparent problems of barter. They were gifts, or symbols, with ritual significance. In a sense, they were debt payments, but this involves the use of the term 'debt' in a different sense to its normal economic meaning today. A payment of intricate woven mats as part of a marriage would have been understood as a symbol of a debt that could not be paid, and not as one family paying another a price for a woman. Again, a payment of compensation for a murder was a process of reconciliation allowing for social stability, and not the price of a life.

There was no 'trucking and bartering' in traditional societies. The idea of somehow making a profit at someone else's expense in a low surplus society would have been impossible – it would have quickly driven others below subsistence, and would not have been a feasible form of social organisation, as has been remarked by Michael Hudson (2012, 2 minutes and 35 seconds into his talk).

Historians of money, like Hudson, tell us that the earliest evidence of writing, mathematics, accountancy, law, money, markets, and an exchange economy dates from more than 5,000 years ago in Mesopotamia. This was a place and time, where and when the development of agriculture had generated the first substantial food surpluses, which could support significant numbers of unproductive individuals, in temples or palace complexes. Ownership of land was centralised, taxes and tithes were raised, and basic food crops were collected, stored and recorded. The unit of account was defined in terms of weight of crop, although taxes could be delivered in a variety of forms, including precious metals.

> **"Instead of trying to locate the origins of money in a supposedly primitive market originally based on barter, we find the origins in the rise of the early palace community, which was able to enforce a tax obligation on its subjects."**
>
> (Wray 1998, p 40)

Specialisation and trade had the potential to develop, and markets to grow, for the first time in history – but it appears that this did not happen as a barter system, naturally evolving out of a human urge to 'truck and barter'. It happened after the development of power structures required the maintenance of palace or temple communities, and record keeping. In traditional societies, people had for centuries made gifts and paid forms of debt, and they were now required to pay a different form of debt to a central authority.

The terms in which this debt was defined became the basis for money as a unit of account and standard of deferred payment, and it is this function - or these functions, if they are seen

as distinct - of money which have always been the most significant for understanding the role money plays in exchange economies. This was true at the very beginning and remains true today. A failure to distinguish between money as a unit of account and money as a physical thing or things, which can be a convenient medium of exchange for other things, has caused a great deal of confusion with monetary theory and even macroeconomic policy.

The essential function of money has always been as a 'measuring rod of value' and a score keeping or accounting device. Once this is understood, the idea that a modern monetary system can best be thought of as a huge spreadsheet (Mosler 2010), which is the analogy modern money theorists often employ when describing the issuance of money by a consolidated government sector as adding points to the score in a basketball game, and the stock-flow consistent models of Godley and Lavoie (2007), become far easier to understand and to accept as a valid description of reality in a monetary sovereign economy.

The monetary system which evolved in Mesopotamia became highly sophisticated. What we can legitimately describe as governments developed debt contracts, compound interest, and financial mathematics. These spread to the non-government sector, such that the majority of commerce was, it is believed, based on credit, with debt contracts recorded on clay tables, or 'bullae'. It appears that some of these circulated, based on the good name of the debtor, and thus became the earliest form of token monetary assets. Hence, the origins of commercial banking lie not in late-medieval Italy but in ancient Mesopotamia.

"In some times and places at least, these bullae appear to have become what we now call negotiable instruments, since the tablet inside did not simply not simply record a promise to pay the original lender, but was designated 'to the bearer'- in other words, a tablet recording a debt of five shekels of silver (at prevailing rates of interest) could circulate as the equivalent of a five-shekel promissory note – that is, as money."

(Graeber, pp 214-215)

The technology to mint coins existed 5,000 years ago, and yet no coins were minted. Silver was exchanged and was used to pay taxes, but it would not have been used heavily, and was not a very convenient means of exchange anyway, prior to the development of coinage. Much of the silver seems to have been kept in temples and palaces, or been used for early international trade. The majority of commerce involved debt. A form of commodity money did exist, but it was money as a unit of account – as a valuation scale, like a measure of distance or temperature, and not as an asset, in the sense of a standardised gold coin with a supposed intrinsic value determined by its weight and purity. Taxes and debts were valued in barley, or in an equivalent amount of silver, but these weights of barley or silver were not regularly used as a means of exchange, except between strangers, and were not even necessary to discharge tax obligations.

"Peasants who owed money to the temple or palace, or to some temple or palace official, seem to have settled their debts mostly in barley...But it was perfectly acceptable to show up with goats, or furniture, or lapis lazuli. Temples and Palaces were huge industrial operations – they could find a use for almost everything."

(Graeber, p 39)

The quantity theory of money would have made no sense at all to a Mesopotamian 'economist'. The same can be said of the idea that there was such a thing as *the money supply*, which could be seen as exogenous and subject to strict government control.

The early history of money and debt are obviously complex. They overlap the very beginnings of writing and of numeracy, and are shrouded by a lack of historical evidence. It is easy to extrapolate from what we know of Mesopotamia to other ancient civilisations of which less is known. Elsewhere, the primitive money of traditional human or gift economies may have played a more prominent role. However, what does appear to be true is that some form of central authority or government, if that term can be used in the widest possible sense, always played a role in the early development of money. It appears that the unit of account employed by these authorities in their record keeping, and in taxes, tithes, fees, tributes and debts, came to be used as the unit of account in early commerce. Because of this, credit and debt played an important role in economic activity from the very beginning. Hence, the stories told by Smith, Jevons and generations of authors of economics textbooks are false.

Truth is much more interesting than fiction. There was even an instability thwarting mechanism in place in early Middle Eastern monetary economies, in the form of occasional debt amnesties that would cancel out non-commercial debts (Hudson 1993, p 20).

From perhaps 3,000 years, there was no coinage, but there was money and finance. The money of account was determined by government, and in particular its value was dependent on the need to pay taxes. There was no unique money as a medium of exchange. Precious metals were mainly used for trade with strangers – international trade – or held in central treasuries. This is important, because coins are a highly durable form of token money. In consequence, economists have often defined the development of coinage as the beginning of monetary history. As we have established, highly sophisticated monetary and market systems pre-dated coinage by many centuries. You might as well date the beginning of money to the invention of paper money, modern central banking, or fractional reserve banking. All these things are important innovations in the history of money, but none of them were present at its inception.

5.2 Coins have never been essential to monetary systems

Coinage appears to have developed in Lydia (which is now in Turkey) around 600BC, and soon after in both the Indus Valley of India and northern China. Coinage may have been initially developed outside government, as gifts or symbols of private debts (like a more durable form of clay tablet); however, in all three places, *'coinage was quickly monopolised by the state'* (Graeber 2011, p225).

The emergence of coinage seems to have been driven by war and the payment of mercenaries, in a new age of conquest. It was accompanied by the spread of slavery. War led to the capture of gold and other precious metals, which had previously been used in international trade, but normally only possessed by the rich or religious and administrative powers. The development of coinage allowed these precious metals to be used to pay far flung armies. The need for more precious metals helped to drive empire building, and the need for workers in gold mines led to a demand for the capture of slaves.

And yet, coins made of gold and silver were generally issued with a face value which limited their use in everyday transactions. They were not generally divisible into small denominations. Lower denomination coins were made of base metals. There was often a shortage of such coins in Ancient Rome, so that low value transactions were still often based on credit. Banking and negotiable instruments were significant in high value commerce.

It is also well established that the face value of coins almost always exceeded the market value of the metal embodied within them, at least within the regions subject to control by the authorities which had minted them.

> **"At least within the communities that created them, ancient coins were always worth more than the gold, silver, or copper of which they were composed….within a city, that city's currency had a special status, since it was always accepted at face value when used to pay taxes, public fees or legal penalties"**
>
> (Graeber, p 245-246)

It was the status of the currency as a mechanism for discharging taxes and making other payments to the state which made this possible. Coins were often debased without immediate inflation, during times of shortages of metal. They might lose value far outside the community, but not within it.

This was an age of great empires, mercenary armies, slavery, and a need for precious metal coinage to pay these mercenaries. However, the local value of money still depended on a powerful, tax-raising government. Coins were used as a medium of exchange, though credit was still important, but the value of money as a unit of account was still underwritten by the need to pay taxes, as explained by Innes (1913) and Knapp (1924).

Many writers have written of a 'reversion to barter' in early medieval times (Wareham 2013). There could, of course, not be a reversion to a barter system for the exchange of basic commodities, as such a system had never existed previously. In any event, there was no widespread adoption of a barter system of exchange. What did happen, once again, is apparently more interesting, if more complex. Economic life became more localised and once again regulated by religious institutions. The role of coins in economic activity diminished, with large scale melting down of coinage to extract precious metals, which were held in monasteries, and, for hundreds of years, insignificant and low denomination new issues of coins. Indeed, for 200 years after the collapse of the Roman Empire, it appears that there was

almost no use of coinage in Britain at all (Grierson and Blackburn 1986, quoted in Davies 1994, p117), though this was not the case on mainland Europe.

Money as a measurement of value apparently continued to flourish, based on the old Roman units, but economic transactions once again came to be based on the exchange of a variety of items (Spufford 1988, p2) and on virtual money, or credit, in local communities. It appears that those coins which existed were used mainly for, much less significant, transactions with traders from outside local communities. In later Anglo-Saxon England, when coins were more significant, it was still possible for kings to withdraw and replace the whole coinage without substantial disruption to the economy (Spufford, pp 2-3), and there remained a widely used virtual money of account - the Carolingian pound (Rossner 2015).

The transition from a largely virtual, credit based economic system to the one which dominated the world economy in various forms for the next 500 years, and inspired Adam Smith, the gold standard, and the myths and half-truths many economists take for granted about the development of money, was long and complex. It seems certain that global discovery, conquest and trade were driving forces once more, just as trade and conquest had been during the earlier period of empires (Graeber, cha. 11).

It is not my aim here to explore the role these factors played within the broader context of the social and economic transformation of Europe, and the rise of modern capitalism and of banking over the centuries which were to come. That is not the purpose of this study. There

have been many descriptions of monetary history, covering the increasing use of coinage, the development of modern fractional reserve banking and (the reinvention of) paper money, and of central banking (including Galbraith, J.K 1975).

The adoption of bimetallism, or more correctly its re-adoption, and the eventual official adoption of the gold standard, in the United Kingdom in 1816 and in the United States in 1869, was, in part, a consequence of the myth of a metallic origin for money; in part, a function of the political power of the rentier class in the nineteenth century; in part, a reaction against inflationary episodes; and in part, a first attempt at a system of fixed official exchange rates between currencies in a rapidly globalising world economy.

The link to gold, once established, was remarkably persistent, in spite of its tendency to collapse during periods of financial crisis, when an elastic supply of currency and the maintenance of a gold standard are mutually exclusive. In spite of the role the gold standard played in exacerbating the Great Depression, particularly in those countries which retained a gold peg for the longest period during the 1930s, a link between the US dollar and gold remained at the centre of the Post-War international monetary system until 1971. It was not until then that the US moved finally – so it seems – off the gold standard, and that the major currencies floated against each other.

5.3 Modern Money

It is of interest that Graeber identified 1971 as an important year in monetary history. He does not, at least in *Debt: The First 5,000 Years*, fully appreciate the significance of monetary sovereignty after 1971, and misunderstands the relationship of the Federal Reserve to the US Government, but he is well aware that the shift to a fully fiat monetary system is a significant shift, and in some senses a return to the virtual money of previous eras. Once again, it should now be clear that money is 'that which is necessary to pay taxes' (Wray 2012), that money does not derive its value from any real commodity, and that money and markets require, and have always required, governmental or other authoritative institutions.

Money is, and has been for thousands of years, mainly chartalist (Keynes 1930, quoted in Wray 2014, p15) and not a Smithian natural private sector development out of a pre-existing barter system. It seems clear that money did not develop when people agreed to use precious metals or any other commodities as a medium of exchange, to minimise transactions costs in already existent markets. Goodhart's 'C-theory' matches the historical record, while the neoclassical 'M-theory' he contrasts it with does not (Goodhart 1998).

If governments were vital to the inception of money and markets, and if markets and money did not and could not develop where they had not existed before without government, then another part of the axiomatic basis of neoclassical economics is swept away. The abstract study of markets in isolation from institutions is meaningless. A macroeconomic model with

no fundamental role for money, credit, and finance, and where these factors are added in through an arbitrary 'cash in advance' constraint, or justified based on Smith's story of natural evolution in response to the problems of barter, has no historical foundation.

Money and finance are never neutral to economic and social development, and neither are they something exogenous to and separate from an essentially money-free 'real economy'. That has only ever been the case in the abstract, 'as if', models of neoclassical economics, and never at any stage in real historical history.

Money has always been a unit of account for quantifying indebtedness, and all modern money is a form of debt. It is the role of money as a measure of our indebtedness to a powerful governmental institution, and for the discharge of other liabilities defined in monetary units, which has provided modern money with its status as a generally acceptable means of exchange, and a safe and perfectly liquid asset. This remains true, whether money is seen as a physical asset, or as virtual money (a pure score-keeping device).

This, of course, implies that it could never be possible to agree on a single and appropriate measure of the 'money supply' within an economy. Drawing a line between debt which is money and debt which is not money is essentially arbitrary.

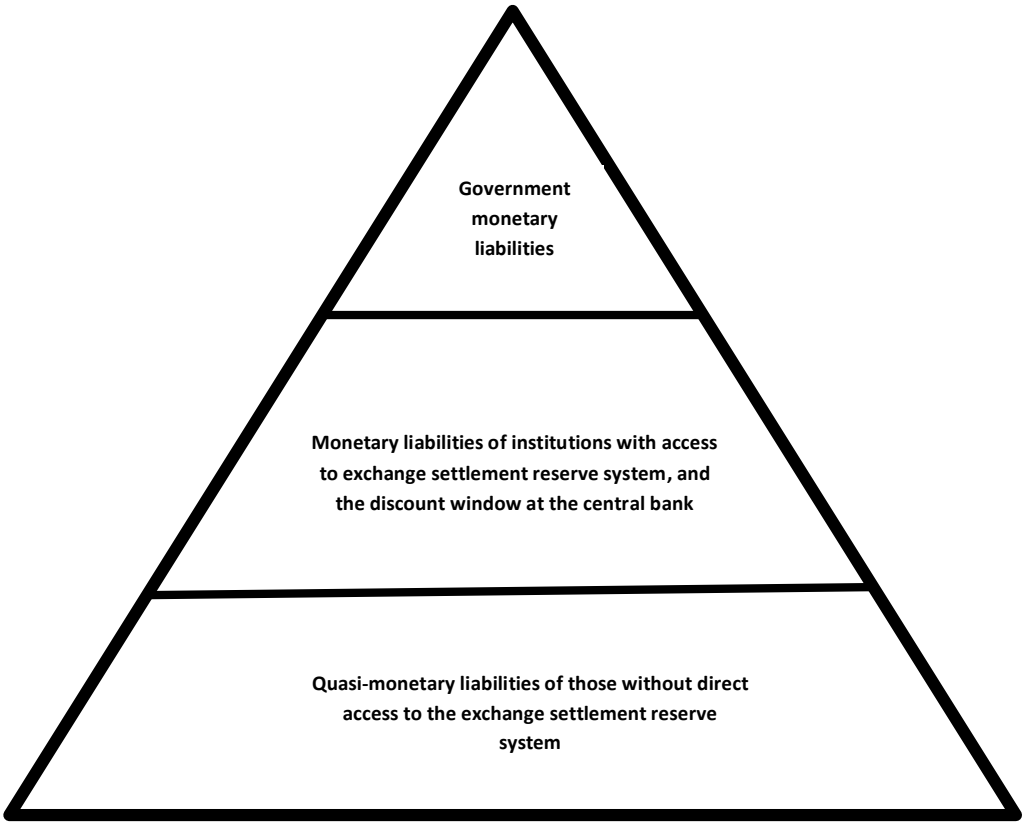
"we can draw the line between 'money' and 'debts' at whatever point is most convenient for handling particular problems"

(Keynes, 1936, p167, fn1)

It was Minsky (1986, p 228) who famously wrote that *'everyone can create money; the problem is to get it accepted'*. If money is another term for debt, then this is of course correct. We can all create our own IOUs, and, if we could persuade others to use those liabilities of ours as monetary assets, we would have created money.

Kelton has described a pyramid of money, with government or central bank liabilities at the apex (Bell 1998). These liabilities are, in a sense, a 'debt' for the government, which is discharged when used by the non-government sector of the economy to pay its taxes or to make other payments to the government.

Figure 5.1: The Pyramid of Money



Commercial banking institutions create money by creating their own liabilities when they create credit for their customers. The liabilities of commercial banks are generally viewed as money, because they are cleared using commercial banks' holdings of government money, and are normally capital guaranteed. They are for most purposes equivalent to holding government liabilities directly, in the form of currency. The deposit liabilities of banking

institutions with access to the central bank clearing process are the nearest private sector money to the apex of the pyramid.

Private debts, which are not bank deposits, may also have some of the characteristics of money, given that they entitle the owner to a claim on real assets, or on a bank deposit, at some future point. They are further down the pyramid. In some cases, the distinction between money and quasi-money assets may be very marginal, with a good example being the liabilities of money market funds in the USA.

The important point is that, in a monetary sovereign economy, it is government liabilities which sit at the top of the pyramid, and other forms of money or quasi-money which derive their status as a nominally safe store of wealth from the fact that they are cleared, directly or indirectly, using government liabilities. It is government money which is the ultimate source of this security of value, and it is government liabilities which the non-government sector will choose to hold during a loss of confidence in other financial assets and in the ability of private sector debtors to clear their debts.

> **"our desire to hold money as a store of wealth is a barometer of the degree of our distrust in our own calculations and conventions regarding the future"**
>
> (Keynes, 1937a)

The significance of the above was touched on in the discussion of Davidson's explanation of liquidity preference theory, in chapter three. A part of that discussion was Keynes' description of money as an asset with a (virtually) zero elasticity of production and a (virtually) zero elasticity of substitution. The significance of this description is clearer now. During a period of heightened uncertainty, such as a financial crisis, the non-government sector desires to hold a higher fraction of its wealth in a nominally safe form. Nominal safety implies holding government liabilities directly, or government-guaranteed liabilities.

Government liabilities cannot be produced in the private sector, however. They are not a commodity which can be mined or an item which can be manufactured. They can only be supplied by the government, incorporating the central bank. This explains the zero price elasticity of supply. If government liabilities are not supplied in sufficient quantities under these circumstances, a severe depression will result. The depression might drive down the general price level, causing a debt deflation, and thereby increasing the relative price of money, but this will not cause the non-government sector to substitute goods and services for money. There is no mechanism whereby any change in relative prices can be relied upon to restore full employment. The problem is not 'sticky prices', and those who think sticky prices are the essence of Keynesian economics have never understood Keynes.

There is one further point of interest, before I move on to a modern monetary macroeconomics which is consistent with a realistic Keynesian 'hard' economics. I will return to this point, but it is worth raising it at this stage. Government liabilities include currency at issue and bank exchange settlement reserves, which are best thought of as sight deposits at

the central bank. They also include government securities held outside the government sector, which are best thought of as term deposits at the central bank. The distinction between a sight deposit and a (transferable and generally highly liquid) term deposit is normally seen as a marginal one. Yet it is conventional to define the former as the 'monetary base', or 'high powered money', or 'outside money', or in my case 'government money'; and the latter as government debt.

It is better either to: (1) regard it all as government debt, including currency at issue (after all, all modern money is debt, most money historically has been forms of debt); or (2) to regard a monetary sovereign government, which does not borrow in foreign currency, as having no debt at all. For our purposes below, the latter option is most useful. Government bonds could easily be replaced by central bank term deposits, which could be classified as 'broad government money', and perform any useful functions currently performed by the government bond market. If this was done, the notion of 'government debt', for a monetary sovereign, could be done away with.

This option is relevant because a confusion regarding the nature of government debt for a monetary sovereign, to the distinction between monetary and fiscal policy, and even to the meaning and significance of monetary sovereignty, has had a major and negative impact on policy formation and on the pursuit of the public good for many years. These confusions disappear once you have gained a detailed understanding of modern monetary theory.

Chapter Six

Modern Monetary Theory and Macroeconomic Policy

"From the perspective of Modern Monetary Theory (MMT), the whole question of fiscal sustainability has to be in terms of maintaining full employment and price stability"

Professor Bill Mitchell, blog post, April 13th 2011

6.1 Modern Monetary Theory and Functional Finance

Modern Monetary Theory (MMT) is an approach to macroeconomics with long historical roots, which is consistent with the best available evidence on the history of money and finance. It emerged in its present form about twenty years ago, initially as a result of a series of academic papers and books written by a small group of Post-Keynesian economists. Philosophically, theoretically and, in the form espoused by most modern money theorists, prescriptively, it is a radical departure, not only from orthodox neoclassical economics, but from much of the earlier Post-Keynesian school. It is in the tradition of 'hard', realistic monetary analysis.

It is particularly associated with the University of Missouri-Kansas City (UMKC), the Levy Institute in New York, and the University of Newcastle in New South Wales. The three principal architects of MMT have been Bill Mitchell (from the Centre of Full Employment and Equity and the University of Newcastle); Randall Wray (from both the Centre of Full Employment and Price Stability at UMKC, and the Levy Institute at Bard College); and Warren Mosler (a successful investment manager, also associated with the Centre for Full Employment and Price Stability). Amongst others who have played a major role in the promotion of MMT are Stephanie Kelton (recently appointed Chief Economist on the US Senate Budget Committee), Scott Fullwiler, Matt Forstater, Pavlina Tcherneva and Marshall Auerback.

A broader awareness of MMT has developed very rapidly in recent years, due to the activities of a number of academic and non-academic bloggers, and has spread particularly widely in those countries which have been the most affected by the successive Global Financial and Euro-Zone crises. Over 2,000 people attended an 'MMT Summit' conference in Rimini, Italy in February 2012, to listen to presentations given by a number of leading MMT-ists, including Stephanie Kelton. There have also been pieces on MMT in the *New York Times* (Lowrey 2013) and the *Washington Post* (Matthews 2012), and many television and other media appearances by Mitchell, Mosler, Kelton, Wray, and others.

The roots of Modern Monetary Theory lie partly in Lerner's functional finance (Lerner 1943), and partly in the state and chartalist theories of money of Knapp and Innes, which are themselves accounts of the emergence and the social basis for the acceptance of money, consistent with the evidence already outlined above. The link from MMT to chartalism explains the term 'neo-chartalism', which is often used to refer to MMT by those who are somewhat critical of its content. These theories of the historical development of money and the basis for its acceptance as a unit of account have long been strongly supported by the available historical and archaeological evidence, which is clearer and stronger today than it was when Knapp and Innes were writing.

MMT also incorporates the endogenous theory of money, which has now been grudgingly and partially accepted by most neoclassical economists, and all New-Keynesians It has, for many years, been an important element in Post Keynesian economics, and is particularly associated with Moore's horizontalism (1988) and the monetary circuit theory of Graziani (1989).

In addition, it builds on much of the life's work of Hyman Minsky, including his balance sheet approach to the financial instability hypothesis; his analysis of the inter-sectoral flow of funds; his explanation of the role played by government debt in an economic downturn; and, at least as used by the main developers of the theory, his employer of last resort (ELR) scheme for tight full employment.

The latter has the potential to be an effective macro-economic instability thwarting mechanism, in an evolving and uncertain economic environment, where no general equilibrium state exists or could exist. I will return to an ELR scheme, or job guarantee, in my final chapter.

MMT also incorporates Wynne Godley's three balances approach to modelling the flow of funds, with the insights that approach can provide to the sustainability of current macroeconomic outcomes, when historical time and stock-flow consistency is incorporated into macroeconomic analysis. A detailed discussion of Godley's later work, with Lavoie, will follow in the next chapter.

The most direct antecedent of Modern Monetary Theory is Lerner's functional finance approach to budgetary policy. Lerner's view was that the fiscal position should be allowed to move to whatever level is required to generate sufficient effective demand to maintain non-inflationary full employment, given the current spending and portfolio decisions of the private sector. The implication is that the fiscal balance is an endogenous variable, reacting to the inevitable cyclical swings in private sector behaviour, and alleviating the normal tendency of capitalist economies to generate insufficient effective demand for the achievement and maintenance of tight full employment.

> **"The first financial responsibility of the government (since nobody else can undertake that responsibility) is to keep the total rate of spending in the country**

on goods and services neither greater nor less than that rate which at the current prices would buy all the goods that it is possible to produce"

(The First Law of Functional Finance, in Lerner 1943, p 39)

This is in contrast with the 'sound finance' of the pre-Keynesian Treasury view, which in its modern form dominates policy thinking again today. It is notable that the term 'sound financial policy' is actually used on the website of the Reserve Bank of Australia, although in the context of the relationship between the Reserve Bank and the Treasury, rather than the appropriate stance of fiscal policy overall.

Under the conventional modern interpretation of 'sound finance', a government may run a fiscal deficit during an economic recession, but ought to avoid fiscal deficits on average across the cycle, or at least to avoid persistent deficits that would be significant enough to increase the ratio of government debt to GDP over time. The central bank should then set official interest rates to achieve an explicit or implicit inflation target, and should avoid purchasing significant levels of government debt in the primary market, in order to avoid 'monetising' the government's deficit. To 'monetise' the deficit is viewed as an unsound financial policy.

"Sound financial policy requires that the Government fully fund any budget deficit by issues of securities to the private sector at market interest rates, and not borrow from the central bank."

(The Reserve Bank of Australia, n.d.)

Implicit in sound finance is the view that 'monetising' government debt, since it adds to high powered money, is potentially more inflationary than debt 'finance' via sales of government bonds to the private sector. This view implicitly incorporates the money multiplier theory of the banking system, and a perceived distinction between the roles of government bonds and bank reserves at the central bank, as forms of private sector wealth.

> **"The second law of Functional Finance is that the government should borrow money only if it is desirable that the public should have less money and more government bonds, for these (in other words, a swap of one government liability for another) are the effects of government borrowing."**

(The Second Law of Functional Finance, in Lerner 1943, p 40, words in parenthesis are mine)

Lerner rejected 'sound finance' in his two laws of functional finance, firstly by explaining that arbitrary government deficit and debt ratios are not an appropriate focus of economic policy, and secondly by demonstrating that deficits do not need to be 'fully funded' through bond sales. Originally, Lerner was writing in an era where persistent inflation outside war time was not anticipated. However, as inflationary pressures built up in the post-war period, he first advocated a tax-based incomes policy, as advocated by Stanley Weintraub, to his proposals (Lerner 1977). He then shifted towards a market-based permit scheme to manage wage increases, which was reminiscent of the cap and trade approach being advocated to deal with excessive levels of pollution (Lerner 1978).

As we will see, these views of Lerner are virtually reproduced by modern monetary theorists. However, they are also now buttressed with Godley's stock-flow consistent approach to macroeconomics; a proper understanding of the significance of monetary sovereignty in determining fiscal (and monetary) policy space; a Minskian analysis of financial instability; and a job guarantee as an inflation anchor.

6.2 Post Keynesian Critics - Palley's Misunderstanding of Modern Monetary Theory

The increasing prominence of Modern Monetary Theory has been largely ignored by the majority of academic neoclassical economists and orthodox journals. At the same time, it has been the subject of controversy amongst heterodox or Post Keynesian economists, with the opening up of a partial schism between leading Modern Monetary Theorists and some (other) Post Keynesians.

Some Post Keynesians, and most notably Thomas Palley, employ the same approach to fiscal arithmetic and apparent fiscal sustainability as the 'fiscal doves' amongst the neoclassical New Keynesian school, such as Paul Krugman. This is the conventional view that larger government deficits, when extrapolated, imply growing government debt to GDP ratios that could eventually be a matter of concern, since, in principle, they could be unsustainable ,or at least lead to inflationary 'money printing'. The statement that *'even if not activated immediately on issue, high-powered money may be activated at a future date and it can be*

difficult to deactivate it in non-disruptive fashion' (Palley 2103, p 17) appears to be the statement of someone who is closer to an orthodox academic economist like Krugman in his understanding of money and banking, than to the central banking specialist Charles Goodhart, or the central banker Ulrich Bindseil.

Palley has attempted to critique the work of modern monetary theorists in two papers (2013; 2014), arguing that what is correct in MMT is not new and what may be new is incorrect (in an unconscious echo of what Keynes predicted would be the response to *The General Theory*). However, his criticisms are either irrelevant – of course, MMT has historical roots – or based on a misinterpretation of the claims made by the developers of MMT. He claims MMT has 'no credible theory of inflation'. The theory of inflation in MMT is the same theory of inflation used by Palley, which is some form of Phillips Curve analysis, and to which I will return in my final chapter. He also claims that Tymoigne and Wray (2013), in their response to a variety of criticisms of MMT, 'fail to justify the claim that the natural rate of interest is zero' (Palley 2014, p1). This is a misinterpretation by Palley of the meaning of that statement in MMT. There is no Wicksellian general equilibrium natural rate of interest in MMT, and indeed the concept was rejected in *The General Theory.* The sense in which a zero rate is 'natural' in MMT is the sense that excess banking system reserves driven by government net spending will inevitably (and so 'naturally') drive overnight interest rates to zero, unless the central bank pays interest on those reserves, or they are withdrawn through central bank operations or government bond issuance .

Labels are a minefield, particularly where Post Keynesians are concerned, so I will not label structuralists, such as Palley, as adherents of 'sound' public finance, but they do not completely reject its basis in logic. They are at least uncomfortable with the idea that the government debt to GDP ratio in a monetary sovereign might not be a matter for concern, and can be allowed to vary endogenously as required to support full employment.

Their acceptance of an inter-temporal government (financial) budget constraint, when combined with a scepticism regarding the existence of any automatic traverse of an economy towards a full employment equilibrium, necessarily locates the underemployment problem in the area of income and wealth distribution. Given that higher income groups (which previous generations labelled 'capitalists' and the 'rentier class') have lower propensities to consume out of disposable income and/or wealth than lower income groups ('workers'), then for a given government budget position, a given external trade balance, and a given level of private investment spending, a less even distribution of income implies a lower level of effective demand and more underemployment. This form of quasi-Marxist argument is inspired by Kalecki's macroeconomic analysis, although Kalecki (1943) himself was under no illusions regarding the technical ability of sovereign governments to pursue full employment. For Kalecki, the barriers to full employment were political and not financial.

The importance of distribution for demand, output, and employment, is a core axiom for many structuralists, and is one of the causes for misunderstandings and disagreements between them and modern monetary theorists. It is not a hypothesis they are easily prepared

to see challenged. In this sense, it is reminiscent of long run money neutrality in neoclassical economics.

Modern money economists, given that they are almost exclusively drawn from a similar Post Keynesian background, and therefore from the left of the political spectrum, in practice share the attitudes of economists, such as Palley, towards the current distribution of income and wealth within most countries, and the trend towards growing income and wealth equality within countries over the past generation. However, they do so on the grounds of equity and not on the grounds that a more even distribution is essential for the maintenance of full employment. According to modern monetary theory, any distribution of income, in an economy with a monetary sovereign government, can be consistent with full employment, and distribution is purely a matter of social equity.

Indeed, in the past, the pursuit of full employment has assisted in the generation of a more equitable distribution of income and wealth, rather than vice versa. As an example, the Clinton years of near full employment provided a brief period of falling inequality in the US, where otherwise all measures of inequality have been rising since the 1970s.

6.3 Core and Supplementary Axioms of Modern Monetary Theory

Like other schools of thought, Modern Monetary Theory has descriptive (positive) elements and prescriptive (normative) elements (Wray 2012). In its descriptive sense, it can be assessed at three levels – Scott Fullwiler (2012, p 5), with a deliberate irony, borrows terms from Eugene Fama's efficient markets theory, referring to weak, semi-strong and strong forms of MMT.

These forms depend on the extent to which the analyst wishes to present MMT within the current fiscal and monetary institutional arrangements in most countries, or within the potential – and I will argue more effective – institutional arrangements which make MMT most clearly factually correct.

Initially, I will confine myself to MMT as a descriptive theory of the monetary and financial system, and build from its simple and precise core statement, which applies in all its forms, but most obviously in the strong form of MMT.

The Central Axiom of Modern Monetary Theory

A monetary sovereign has no financial budget constraint.

To a modern monetary theorist, this eight word statement is a demonstrable fact, and so ought not to require the label of 'hypothesis'. Indeed, some argue that, when Modern Monetary Theory is seen strictly in this (very) narrow sense, it is not a theory at all, but purely a description of something which is obviously, axiomatically true. This is what an ideal 'axiom' is supposed to be – a statement which is so obviously true as to require no further justification. Nonetheless, since the core axiom of Modern Monetary Theory is not generally understood, even by many academic economists, it will be necessary for me to provide both an explanation and a justification.

A monetary sovereign is a currency-issuing government, which does not guarantee to convert its currency into any other currency or asset at a fixed exchange rate, and does not hold significant and unhedged foreign currency net liabilities. Therefore, governments maintaining fixed exchange rates, or governments maintaining a gold standard, or governments using a foreign currency as the domestic unit of account and medium of exchange, whether as a result of joining a monetary union, or through dollarisation, are not monetary sovereigns. Governments with high levels of foreign currency debt are also not fully sovereign. This does

not mean that the insights provided by Modern Monetary Theory are completely inapplicable to them, but it does imply that the central axiom is not valid.

This of course does not imply that a monetary sovereign government has no constraints on its spending at all, or that its level of spending has no implications for exchange rates or inflationary pressures. Such constraints are liable to be severe for small, low income economies with a heavy dependence on imports. All governments must operate within *real constraints* determined by available productive resources, technology, and ecological limits. One of the functions of a well designed job guarantee scheme, which will be discussed below, can be to permit a society to live within these limits, without resorting to underemployment and growing inequality. Beyond these limitations, monetary sovereign governments face no financial constraints on their activities, except those which are self imposed or the result of purely institutional arrangements which could be changed.

Supplementary Axiom

Monetary sovereign governments face real resource and ecological constraints,

but no financial ones.

The fact that so many economists, and almost all policy makers, imagine this not to be the case is in part the consequence of an invalid theoretical and historical perspective on the nature of money and banking, which is virtually inescapable for economists trained in orthodox general equilibrium theory; partly a result of current institutional arrangements acting as a veil to hide the truth; and partly an anachronism from the gold standard, or, at least, the US gold exchange or dollar standard, which was in place until 1971.

The simplest framework to demonstrate the validity of our core axiom is an apparently unrealistic one, where there is a 'consolidated government sector' with no central banking institution separate from the central government, or at least where the central bank is treated as a government department and the government can draw on an unlimited overdraft at the central bank. This conflation of the central bank with the central government is strongly objected to by most critics of MMT, on the basis of unrealism. For the moment, I will accept that criticism – noting, as Minsky said, that institutions which are currently a barrier to the pursuit of the public purpose can always be changed.

An argument can be made that current central banking arrangements may be anachronistic. Independent central banks have not always existed across modern monetary history, and there is no essential reason why we should conclude that they have a permanent historical role to play. A further justification for the 'consolidated government sector' metaphor is the standard one for starting with simplifying assumptions, where we are explaining a theory in a simplified framework initially, before extending the theory to deal with the greatly complexity of a fully realistic institutional framework.

If there is no central bank separate from the central government, then there is no distinction between the balance sheet of the central bank and the central government. In this case, Fullwiler's strong form version of MMT applies and the following characteristics of government expenditure are evident

- Government expenditure involves the creation of funds in bank cash reserves, held with the government, and the creation of bank deposits for the recipients of this expenditure. Governments literally spend via key-strokes, and there are no financial limitations on government spending (beyond normal budgetary processes).

- Since there are no financial limitations on government spending, the government does not need taxation and other revenues to finance its spending. It has, therefore, no fiscal motivation for issuing government securities.

- Taxation exists not to finance government spending, but purely to modify private sector behaviour and economic outcomes. Taxation is there primarily to mitigate private sector purchasing power by reducing disposable incomes; to create room within full employment output for non-inflationary government spending; and to create sufficient demand for government money to maintain its acceptability and price stability. In addition, the conventional micro-economic functions of discouraging negative externalities and contributing towards a socially acceptable distribution of income and wealth remain valid.

- In this institutional set-up, there is no distinction between sales of government securities by the central government (which are conventionally seen to have the role of 'funding' the government deficit and avoiding its more inflationary 'monetisation') and sales of securities by the central bank (which are concerned with the management of bank cash reserves and the maintenance of the official interest rate target). The former motivation for bond issues does not exist, and bond issues are clearly about liquidity management for the purposes of interest rate maintenance on the overnight cash market. Sales of government securities in this institutional set up can only be employed for this purpose, which makes them monetary policy operations rather than fiscal, and a means of providing a safe, interest bearing asset to fulfil the requirement for a nominally safe benchmark asset in private sector portfolios.

- The overall size of the government relative to the private sector remains a political issue, dependent on preferences for public goods as opposed to private goods and the corresponding mix of private to public sector activity; and a level of taxation deemed necessary to ensure total spending does not exceed a level consistent with full employment. The fiscal balance is then free to move over the cycle, in response to automatic stabilisers and discretionary policy changes. The balance is mainly determined endogenously, by non-government sector spending and saving behaviour (where the non-government sector includes both the domestic private sector and foreign trade).

6.4 Further Criticisms

Critics of Modern Monetary Theory, including some Post-Keynesians, point out that the conflation of the central bank with the central government ignores current institutional realities, and encourages what they believe to be provocative and non-inclusive statements. Marc Lavoie, who is broadly sympathetic to Modern Monetary Theory and, it is fair to say, has become increasingly so over time, and who emphasizes its links with European monetary circuitists, is of this view (Lavoie 2011).

One response to these criticisms is to argue that all of the above claims are still true, even when the central bank exists as a separate institution from the central government, as long as the central bank is prepared to 'lend' to the central government without limit; to purchase government bonds when required in the primary market; or simply to provide the central government with an unrestricted 'overdraft facility'. American and Australian central bankers have confirmed publicly that they would 'never bounce a government cheque' (Mosler 2010, pp 23-24). Fullwiler describes this as 'weak form' modern monetary theory. This is more than enough.

Government spending then generates an asset for the central bank, in the form of government securities or an overdraft to match the liability of increased commercial bank reserves, and, of course, increased bank deposits. There is, however, still no financial limitation on government expenditure. Everything else remains as before – although it is

apparently the case that government spending is financed through taxation or bond sales (as they lead to credits on the government's balance at the central bank, which are 'necessary' to permit government spending from this balance).

This is, to a modern money theorist, a misleading way of describing financial processes. In practice, the government can, as in the strong form case, spend without limit through the use of keystrokes, and buy anything which is available for purchase in domestic currency. The existence of a separate institution called a central bank, with its own balance sheet, does not alter the fiscal space available to a monetary sovereign government. It is, in effect, just a convention of public finance accounting.

Even the above is not, however, an accurate description of the typical current institutional relationship between most modern central banks and central governments. It has, for decades in most high income countries, been the case that the central bank does not purchase significant amounts of central government debt in the primary market, or that the government maintains a significant overdraft on its account at the central bank. In some countries, such as the USA, this is backed up by legislation, while in others it is just the established practice, although the degree to which this practice is pursued differs between countries. In Canada and Japan, for example, central banks do buy government securities in the primary market. The brief justification, if this can be dignified by such a term, given on the website of the Reserve Bank of Australia is that the full 'funding' of the government deficit through net sales of government securities by the Treasury is consistent with 'sound financing', as I have already mentioned.

A superficial understanding of prevailing institutional arrangements suggests they support the concerns of orthodox economists, like Krugman, and others, like Palley, regarding the long run sustainability of government deficits. They also reflect the perceived economic functions of taxation and government bond sales. Such critics of modern monetary theory argue that the core axiom of modern monetary theory is violated, in that growing government deficits which are not monetized necessitate growing net purchases of government securities by the non-government sector, which could create an excess supply of bonds. An excess supply of bonds would drive up bond yields and, particularly when combined with credit ratings downgrades, raise increasing concerns about government solvency. The increase in bond yields would raise interest rates generally, which could crowd out private sector spending.

The other possible outcome is a move away from 'sound finance' and towards 'monetization' of the debt by the central bank, which it is argued is more inflationary, presumably – though this is rarely clarified – the result of the application of the money multiplier to credit creation, and perhaps the result of long run money neutrality, or at least because of aggregate demand rising above the level consistent with stable inflation.

In this case, significant and persistent (or 'structural') fiscal deficits are a matter for concern, and taxation and bond sales are restored to their orthodox function of financing government expenditure, in the sense that they must happen before government expenditure can take place.

It is understandable that so many orthodox, and even some heterodox, economists think along these lines. The logic is intuitive, and of course it echoes the inescapable budgetary truths which apply to all decision making units other than monetary sovereign governments. Every other economic unit faces a binding inter-temporal financial budget constraint, ignoring for the moment the option of bankruptcy. Every other economic unit must earn income, benefit from capital gains, run down assets, or run up debts (or financial liabilities), in order to finance spending, where debts must be repaid in the future.

Our normal human system one thinking approach is to instinctively draw parallels between non-sovereign and sovereign budgets, and the use of terminology such as budget deficit (which implies a shortfall or deficiency) and government debt (which implies something burdensome, and in a sense immoral, which must be paid back) biases even highly trained economists to draw these inappropriate connections. It is unsurprising that politicians, journalists, and others without this training habitually interpret the term ‘surplus’ as something good, which is a sign of success akin to a company being in profit, and ‘deficit’ as something bad, and a sign of failure, like a corporate loss which could lead to insolvency.

However, this analysis, although it appears to be based on sound intuitive reasoning in the context of current institutional arrangements, is factually incorrect. Current arrangements are a veil, hiding the truth regarding the fiscal space available to monetary sovereign governments, and misleading not only the community at large, but also, as suggested above, the majority of economists.

To demonstrate the truth of this, suppose a government plans to engage in a major additional element of expenditure. This spending will require funds to be debited from its balance at the central bank. These funds will not be covered by tax and other revenue, or by currently planned bond sales. The government treasury therefore plans further bond sales to 'finance' this spending. The spending takes place. The immediate impact of the spending is to transfer funds from the government's account at the central bank to the reserve accounts of the commercial banks, and of course to create deposits at commercial banks for those in the non-government sector who are the recipients of this spending.

The increase in bank reserve accounts floods the banking system with reserves. In the absence of central bank liquidity management to offset this effect, the cash rate on overnight inter-bank lending must fall to the rate at which the central bank pays on reserve deposits, or to zero where no such interest is paid by the central bank. Assuming that the central bank maintains a target cash rate, which has been the case in almost all economies for many years now, either the treasury or the central bank will need to drain these reserve balances from the banking system to prevent the cash rate falling below its target.

In countries with a sufficient supply of government securities, this will normally be done via outright or repo sales of government bonds to the banking system. Notice that rather than bond sales being a fiscal policy tool used to pay for government spending, and potentially forcing interest rates up by eating into the supply of loanable funds, in practice bond sales act as a monetary policy tool to withdraw from the system those reserves which government

spending creates and to counter the natural tendency for government spending to push interest rates down.

Government spending comes first, creating the reserves which are then available to purchase government securities (Bell 2000). This is Fullwiler's 'semi-strong form' version of modern monetary theory. From a functional perspective, it is irrelevant whether the net sales of government securities are undertaken in the primary market by the government or in the secondary market by the central bank. In both cases, they are required for interest rate management purposes.

Another fact, which appears counter-intuitive to economists steeped in loanable funds, exogenous money, and the ISLM model, is that government deficits do not drive nominal interest rates up – not directly, anyway. Short term interest rates are a policy variable, easily and unquestionably able to be controlled by the central bank. Longer term rates are influenced by expectations of future short term interest rates, as indicated by the mainstream theory of term structure, but again can be controlled by the central bank using its balance sheet, as the recent experience of the US indicates. As explained above, government expenditure that is not offset by taxation, fees or debt sales by the central government or central bank, or other liquidity management operations, inevitably reduce short term interest rates towards zero, or to the floor rate paid by the central bank on bank reserve accounts.

In this sense, the only 'natural' rate of interest in a model of the economy based on realistic financial institutions is a nominal rate of zero. It is normal for government spending to exceed taxation, and, in the absence of bond sales, this will naturally imply excess bank reserves and a zero cash rate. The various versions of loanable funds theory developed by orthodox neoclassical economists in the late nineteenth and early twentieth centuries, which were rejected by Keynes, before being at least partially rescued by Hicks in his IS-LM model, and eventually restored in modern general equilibrium theory, are clearly rejected when modern money theory is understood.

Any non-zero nominal interest rate is, as is now generally accepted, a policy variable, and since there is no simple relationship between nominal interest rates and inflationary pressures, there can be no natural real rate of interest at all. Wicksell, Fisher, Taylor and Woodford, and the whole orthodoxy ,are refuted.

An understanding of central banking operations, the modern system of bank reserve accounts at the central bank, and the impact of government expenditure on these reserve accounts and on the overnight cash market, makes all this clear.

A critic of modern monetary theory might instinctively react to the above by arguing that the central government requires a positive balance in its account at the central bank before the above process can even begin. Hence, logically, tax revenues or bond sales predate the government spending. Stephanie Kelton has, on the other hand, rightly pointed out that for

high powered money money to exist, either the government or the central bank must previously have 'spent' that money into being, and for the high powered money to increase the net financial wealth of the private sector, this must be a fiscal operation - since monetary operations involve no net increase in the financial assets of the non-government sector (Bell 2000).

This argument about logical priority is one which modern money theorists and other Post-Keynesians have expended energy and a degree of passion on, but it is in the end a sterile argument. All we need to assume is that the central bank would not permit the central government to default on its obligations in its own currency, or that, as is undoubtedly technically correct, the sovereign government has the power to change institutional arrangements if necessary, to permit the government to instruct the central bank to do this, and we would return again to the central axiom of modern monetary theory.

It is almost unheard of for a monetary sovereign to default on debt denominated in its own currency. By the time of the Russian default on its domestic currency debt in 1998, Russia was (just) monetary sovereign, in the sense that it abandoned its exchange rate peg on the same day as the default, and consequently Russia was not forced by any economic imperative to default on its ruble-denominated debt. It was instead the result of incompetence in the middle of a chaotic situation (as described in Chiodo & Owyang 2002). US politicians have in recent years toyed with the idea of not extending their self-imposed debt ceiling, which did not always exist and dates from World War I, with the implication that they might default on

government obligations. However, given the obviously catastrophic consequences this would have for the global financial system, it did not happen.

Again, this would have been entirely a political decision. The central axiom of Modern Monetary Theory simply implies that no monetary sovereign government will ever be forced to default on debt denominated in its own currency, and further, that it will never be forced to issue such debt in the first place, simply because it faces no financial constraint on its expenditure at all.

Returning to the issues separating modern monetary theorists from those Post Keynesians who find it difficult to fully accept the former's claims, the issue of language can now be addressed very clearly. Under strong form Modern Monetary Theory, it is literally the case that governments spend by key-strokes, and that neither bond sales nor taxes in any sense finance government spending. In the strong form case, there is no distinction between the central bank and the central government, and we have it on very good authority that central banks have limitless ability to create money. All central bankers know this, including both Greenspan and Bernanke:

> **"The United States can pay any debt it has because we can always print money to do that. So there is zero probability of default."**
>
> **(**Alan Greenspan on NBC's 'Meet the Press' in 2011, just after the Standard and Poor downgrade of US government securities)

'The banks have accounts with the Fed, much the same way that you have an account in a commercial bank. So, to lend to a bank, we simply use the computer to mark up the size of the account that they have with the Fed.'

(Ben Bernanke, on '60 Minutes' in 2009, commenting on the fact that Federal Reserve lending and asset purchases do not use 'taxpayers' money').

Under a semi-strong form of Modern Monetary Theory, it is just as valid to say that taxation and bond sales appear to finance government expenditure, as it is to say that a monetary sovereign government does not literally need to tax or borrow to spend. Any argument between structuralists, or anyone else, and modern money theorists in this context, ought really to be seen as merely a question of terminology. If it is anything more substantive, then there is no question that modern monetary theory provides the correct description of the system.

Under a weak form of Modern Monetary Theory, the case for modern money sceptics such as Palley, or critics who are broadly sympathetic but reluctant to fully embrace the MMT label, such as Lavoie, is stronger; at least if we maintain that central banks do not purchase government debt on demand in the primary market, and could in principle refuse to do so and force a government into insolvency and default.

However, in practice governments in control of the legislative process always have the power to over-ride central banks on this issue. As Bernanke and other central bank insiders have

said, the Federal Reserve is a 'creature of Congress' (O'Driscoll 2011). The regular legislative paralysis of the American political system should not cloud our judgement as to the reality of power relations between central governments and central banks. It may be useful to continue the practice of an institutionally separate central bank with a degree of independence from the political process, but in practice, in every monetary sovereign state, power rests in the end with the sovereign government.

The reality of this is demonstrated by the lack of a relationship between government bond yields and government debt ratios in the years since 2007, and even well before that. In the case of Australia, the absence of any evidence for 'crowding out' is demonstrated in Mitchell (2000), where it is shown that changes in the Australia federal deficit do not Grainger-cause changes in either short or long term interest rates.

6.5 Importance of Monetary Sovereignty

Those governments faced with solvency crises and a period of high required yields on their debts, subsequent to 2008, were the non-monetary sovereign, peripheral European states – Spain, Italy, Portugal, Greece and Ireland. The rapid increase in the government debt to GDP ratios of the USA and the UK did not increase yields – indeed, yields fell as a result of the crisis. And despite many years of criticism from the major credit ratings agencies, and their

orthodox, neoclassically-trained economic staff, the record government debt to GDP ratio of the Japanese government has had no impact on yields.

Apologists for neoclassicism look for special case explanations in all these cases – Japan's positive net international investment position (Grenville 2011); the US dollar's role in the global financial system (Eichengreen 2011, p4); and for all I know some characteristic of the UK - but they miss the single essential fact which explains everything else. The monetary sovereign nations, which are able to borrow in their own currency, are borrowing in a currency which they issue, and therefore they face no financial budget constraint. Under no circumstances, can they be forced to default on their debt. They could in principle retire their debt – if not their liabilities – tomorrow, by simply replacing issued bonds with private sector reserve balances at the central bank. This is not to say that government net spending can not be inflationary, and it is not to say that it cannot be associated with a depreciating currency.

The central axiom of MMT applies, always and everywhere, for fully monetary sovereign governments.

Once this is accepted, then the essential roles of taxation are to limit private sector spending and to ensure a demand for nominally risk free government liabilities – not to finance government spending. The issuance of government securities is to provide nominally risk-free financial assets to the non-government sector and/or for the purposes of interest rate management in the cash market. The only remaining (although not in my view legitimate)

criticism of modern money theorists, like Wray is that they could state these truths less sensationally, and with greater compassion, to the many eminent orthodox economists who struggle with these facts, because they have been trained to accept financial sovereign government budget constraints; crowding out; exogenous money; the money multiplier; money neutrality; and all the other elements of orthodox neoclassical economics which are comprehensively undermined by modern monetary theory, nested within Post-Keynesian macro-economics.

Paul McCulley made just such a remark in a speech he gave at the 2012 Hyman Minsky Summer Seminar which I attended, at Bard College, in New York. He told his audience that modern money had won all the arguments, and now needed to show 'compassion' (his word) to orthodox economists, like Krugman, who were struggling to take reality on board. Krugman is still struggling to shift from a neoclassical to a realistic understanding of banking and the monetary system (Keen 2015).

Our current institutions and conventions are clouding the essential truths about the operations of our monetary system – even from prominent and so-called progressive economists. Inspired by Minsky (1986, p 325), a suggestion which follows from this apparent confusion regarding institutions, functions, and language, is to change and to simplify what is an anachronistic institutional set-up; to clarify the functions of processes such as bond sales and tax raising; and to thereby clarify operations to prevent confusion.

For the sake of simplicity, I maintain that a central bank described and accounted for as an institution separate from the central government is an anachronism, perhaps justifiable in the days of the gold standard, and even perhaps in a fixed exchange rate regime, but with no logical justification in a monetary sovereign state. This does not mean that you can not have an independent panel determining a target overnight interest rate, or indeed the term structure of interest rates, because the central bank can use its balance sheet to set the whole term structure, as has been demonstrated by the Federal Reserve through its quantitiative easing policy. Neither does it mean that other functions normally carried out within a central bank can not be at 'arm's length' from political leaders.

What it ought to mean is an end to the practice of classifying the central bank as though it was a private commercial bank in national flow of funds accounts, as is generally the case at the moment. It would also bring to an end the fiction that the central bank is genuinely a non-government organisation, whose balance sheet should be excluded from the consolidated general government balance sheet. It would clearly demonstrate that the strong form of modern monetary theory is not just a simplified theoretical model of how a monetary system could work, but a factually accurate representation of how it does work. There would no longer be any room for debate or confusion.

In most countries, the central bank is part of the government and legally owned by the government. Even in the USA, where this is not the case for historical reasons, in practice almost all the distributed earnings of the Federal Reserve constitute income for the Treasury.

What's more, the Federal Reserve is 'a creature of' Congress. The Federal Reserve is effectively a part of the US government. It can not be any other way in a monetary sovereign.

To be fully monetary sovereign, you need your own currency and central bank, whether formally a part of the general government sector or not, and a floating exchange rate regime. If you are on a gold standard or other commodity or fixed rate system, your sovereignty is compromised – particularly if you are on a strict gold standard, with high powered money restricted to the value of gold reserves, but less so if you run a gold standard regime the way it used to work in practice, where you commit to maintaining sufficient reserves of gold to assure currency convertability at a fixed gold price.

There is the potential for additional government spending which is not cancelled out through taxation or debt issuance to lead to falling gold reserves, threatening the maintenance of the fixed price. There is at least a loose financial budget constraint.

The same thing is true under fixed exchange rates (a foreign currency standard), or under any system where you guarantee to convert your currency at a fixed parity into something other than itself. This is, at least in a superficial sense, similar to the 'impossible trinity' or 'policy trilemma' problem of monetary, financial and exchange rate policies (Obstfeld & Taylor 1997), which became so widely discussed during and after a series of currency crises in the 1990s.

The ‘impossible trinity’ is, in its simplest form, a statement that only two of the following three policy objectives can be sustained:

- A fixed exchange rate parity
- Monetary policy independence – or setting interest rates in line with domestic policy objectives, rather than for the purposes of exchange rate maintenance
- Financial capital mobility – the freedom for short and long term financial capital flows to enter and leave your domestic financial system without restrictions or taxation

Feasible policies are said to include the following: firstly, a fixed parity and policy independence, backed up by capital controls to allow for a disparity between risk-adjusted domestic and foreign interest rates by limiting the flow of funds between currencies and avoiding speculative attacks undermining the fixed parity. Secondly, a fixed parity and free capital flows, made possible by a sacrifice of monetary policy independence so that domestic interest rates follow foreign interest rates and are set to maintain the exchange rate peg Finally, a floating exchange rate and free capital flows, made possible by a willingess to let the exchange rate move to balance demand and supply in the foreign exchange market.

The truth is of course more complex, with, for example, no theoretical limitation on the ability of a central bank to resist upward pressure on its currency under free capital flows and an

independent interest rate policy, as long as the central bank is prepared to increase the size of its balance sheet to a sufficient degree. The Swiss central bank pursued exactly this strategy against the euro until January 2015, and the decision to abandon its minimum price for a euro in Swiss Francs was a voluntary policy decision. It was not forced onto the country by any financial imperative. In addition, the distinction between *de jure* and *de facto* exchange rate regimes, and the reality of greater or lesser degrees of exchange rate management under what are *de jure* floating exchange rates, means the impossible trinity becomes more of a trade off between exchange rate management and monetary sovereignty in practice.

The 'impossible trinity' becomes a 'bipolar view' of exchange rate policy, once the modern orthodox neoclassical presumption of the free movement of financial capital is added to it (Fischer 2001). Governments then must choose, at least in principle, between an independent interest rate policy and a fixed exchange rate. Moreover, a commitment to a fixed exchange rate must be credible, to insure against speculative attacks, which implies a 'hard peg', such as a credible currency board – as in Hong Kong – or full monetary union or dollarisation.

To a modern monetary theorist, the crucial decision is the maintenance of a floating currency. Capital controls may be desirable for a variety of reasons, including the limitation of volatility in the currency, but are a secondary issue. A fixed exchange rate commitment is, in the majority of cases, to be avoided, since it severely restricts monetary sovereignty – especially for a country with limited foreign exchange reserves. Monetary union, without a well designed fiscal union, is a decision which only appears to make sense if you are in ignorance of the role monetary sovereignty plays in guaranteeing the fiscal space required to stabilise

an inherently unstable economy. It is a policy error which general equilibrium theorists, for whom money and finance are neutral and a stable full employment equilibrium is 'natural', are especially likely to commit. In the case of the Euro, the error was committed in defiance of clear warnings from heterodox economists and central bankers, such as Wynne Godley (1992) and Charles Goodhart (1998).

6.6 Orthodox Views of Fiscal Sustainability

Having established the axioms of modern monetary theory and the notion of monetary sovereignty, I will now address the orthodox view of fiscal policy. The most common orthodox neoclassical view of fiscal policy, even today, is that outlined in Fischer and Easterly (1990), where the authors claim that: 'as a first approximation, printing money shows up as inflation, excessive use of foreign reserves leads to crises in the balance of payments, high foreign borrowing leads to a debt crisis, and too much domestic borrowing leads to high real interest rates and crowding out of private investment' (p 127). The same simplistic logic, and neglect of the vital issues of causation and of monetary sovereignty, can be found in the famously flawed, more recent, paper by Reinhart and Rogoff (AER 2010).

Fischer and Easterley describe the pre-Keynesian approach to fiscal policy as a presumption that in peacetime the fiscal balance should be in surplus, or at least balanced, to allow for wartime budget deficits. This was the 'Treasury View' of what I have already described as

'sound finance'. Their description of the Keynesian revolution is an acceptance that fiscal deficits might also be justified during recessions, but 'that the budget should be in balance on average across the business cycle' (p 128).

This is in contrast to the prescriptions of Lerner's functional finance, and to the views of Godley and the Modern Monetary Theorists, for whom the government balance should be determined at whatever level is necessary for non-inflationary full employment, given the economic behaviour and portfolio preferences of the non-government sector. A persistent desire on the part of the non-government sector for the accumulation of net financial assets endogenously drives persistent government deficits, if approximate full employment is to be maintained.

In Fischer and Easterley, the national income accounting identity is incorrectly described as 'the resource constraint facing the economy as a whole' (p 128). It is of course no such thing – it is simply an identity relating to the inter-sectoral flow of funds, and does not incorporate a real resource constraint. The extraordinary persistence of this confusion in the work of eminent neoclassical economists is ongoing to this day.

Budget deficit = (private saving-private investment) + (current account deficit) (6.1)

They then fall into the same trap as the great majority of neoclassical economists, which is the very trap Keynes warned against when confronted with this identity (equation 6.1).

> **"To illustrate the use of this equation, suppose the economy is at full employment, and take the rate of saving as given"**
>
> (Fischer & Easterly 1990, p129)

As Davidson would say, they have implicitly accepted the neoclassical money neutrality axiom, which is dependent on the gross substitution and ergodic axioms rejected in The General Theory. This is New Keynesian economics, which has nothing to do with Keynes. They have assumed the economy is operating at its real resource constraint, without describing that constraint or explaining how the economy is supposed to get there. The neoclassical synthesis is assumed.

One of the main messages in *The General Theory* and Post Keynesian economics is that free market economies have no natural tendency to settle at full employment; that they will generally be characterised by significant unemployment and underemployment; and that private sector savings must not be treated as a given but instead as a variable dependent on the level of effective demand. In Keynes, an increase in the fiscal deficit can contribute to higher effective demand, higher capacity utilisation, a higher marginal efficiency of capital (or demand price for capital goods), and higher private sector investment spending.

Kalecki described this more fully than Keynes, in his analysis of the business cycle which partially predates Keynes' General Theory, and describes the role the fiscal deficit can play in sustaining corporate cash flows and profitability in his famous equation for corporate profits (Kalecki 1971). Later, Minsky (1986) used Kalecki's equation to explain that following a financial crisis induced recession, the fiscal balance could support economic activity via the normal Keynesian multiplier (as in *The General Theory*), by providing a source of profit for business finance (as in Kalecki's manipulation of the national income identity) and by supplying nominally risk-free securities to a highly risk-averse non-government sector.

Of course, if you without any logical or empirical justification assume there is full employment and a fixed supply of saving, and assume that causation runs from left to right in the identity, then an increase in the fiscal deficit must either crowd out private sector investment spending or increase the current account deficit or both, as Fischer and Easterly point out.

These authors then refer to evidence of a positive correlation between fiscal deficits and trade deficits in some countries, but also identify examples, such as the United Kingdom in the late 1980s (and later they could have identified the USA in the late 1990s or Australia in the 2000s) when this has not been so.

They then describe the impact of Friedman's permanent income hypothesis view of consumption and Barro's Ricardian equivalence theory of fiscal policy and government debt

on what they call ‘standard Keynesian analysis’. This would be the same standard Keynesian analysis which ignores Keynes, as I have already explained.

Orthodox neoclassical authors never make reference to Duesenberry’s relative income hypothesis, which explains the so-called anomalies with the Keynesian consumption function at least as well as the theories of Friedman; and which has greater descriptive power and is far more consistent with the work of modern psychologists and behavioural economists, and arguments presented by authors as diverse as Veblen and modern neuro-economists, than Friedman’s theory (Frank 2005).

This is another case of orthodox neoclassical economists being attracted to a neat normative theory of how narrowly rational economic agents ought to behave, as opposed to a positive theory of how real human beings actually behave. It has its roots in expected utility theory and substantive rationality, as normative theories of human behaviour, when we should be rooted in Prospect Theory and procedural rationality, as positive explanatory theories.

As for Ricardian equivalence, it is based on so many unlikely assumptions as to have been reluctantly abandoned now by such prominent New Keynesians as Woodford and Bernanke, in favour of versions of the – equally misleading - fiscal theory of the price level. This is a classic case of a degenerative research program, in Lakatosian terms, retreating from non-core theories in order to protect an inviolable axiomatic core. And yet it is still taught to new acolytes in university economics departments, to the extent that a patient explanation of its

absurdity to young graduate students can at times be met by a mix of incredulity and outright hostility.

Ricardian equivalence, as expressed by Fischer and Easterley, is the view that 'under a very specific set of assumptions, lump-sum changes in taxes would have no effect on consumer spending. What is more, a cut in taxes that increases disposable income would automatically be accompanied by an identical increase in saving. This is the co-called Ricardian equivalence result, which states that deficits and taxes are equivalent in their effect on consumption' (pp 129-130).

The assumptions are well-known, and well-known to be invalid, as is the obvious empirical prediction of fiscal policy neutrality with respect to aggregate demand. I won't list them in full. It is worth noting, though, that they include the widespread fallacies that government debt has to be repaid, and that a far-sighted and long-lived individual will see a tax cut (or increase in government spending) now as needing to be balanced by the expected present value of higher taxes (or government spending cuts) in the future. Consequently, taxation and government borrowing are equivalent, and government bonds are not seen as additions to non-government sector financial wealth. Like most neoclassical economists, they don't understand the role of government debt issued by a monetary sovereign, and wrongly assign it the attributes of non-government debt, rather than the attributes of money.

From the perspective of a modern monetary theorist, this is especially perplexing, since in modern monetary theory, base money and government bonds are both financial liabilities of the consolidated government sector, and very similar financial assets – and yet orthodox neoclassical economists see government-issued money as adding to non-government financial wealth and as having a definite impact on nominal demand, whereas government bonds do not. It is worth repeating that government-issued money, when held in the form of commercial bank reserves at the central bank, now generally bears interest, and that these reserves are therefore not essentially different from domestic currency government bonds. Any distinction is entirely arbitrary, and profoundly misleading. Yet the standard orthodox neoclassical model treats one as increasing aggregate demand and the price level, via the banking multiplier and the neutral money axiom, and the other as having potentially no effect on aggregate demand and the price level, due to the permanent income hypothesis and Ricardian equivalence.

This is all the consequence of orthodox neoclassical economists misunderstanding the nature and role of money, and misrepresenting and misunderstanding the role and impact of the government budget balance. This can be clarified with reference to their discussion of a further identity – an equation that is sometimes misleadingly described as the government budget constraint. It is presented in Fischer and Easterley, as follows:

Deficit = money printing + (foreign reserve use+ foreign borrowing) + domestic borrowing

(6.2)

The term ‘money printing’ itself is at least ambiguous, and unintentionally misleading, from a modern monetary theory perspective. It refers to the creation of exchange settlement reserves in the banking system. The statement that ‘money printing is associated with inflation’ adds the banking multiplier fallacy to the neutral money (or quantity theory of money) fallacy. It risks confusing broad measures of the money supply with bank reserves and base money.

All government spending, per se, increases both the broad money supply and exchange settlement reserves, and, therefore, base money. All taxation decreases broad money and base money, dollar for dollar. The issuance of government bonds to the non-government sector will reduce bank reserves, regardless of the purchase of the bonds, but it will only reduce broad money if the purchaser is a non-bank (or in Australia, a non-ADI).

The equation of base money creation with general increases in the money supply implies an acceptance of the banking multiplier theory, which has long been dismissed by those with experience of central bank operations. It is true that until recently policy makers often discussed issues such as quantitative easing as though a banking multiplier was operative, and academics have often – even recently – implied that the banking multiplier is relevant outside of the zero-bound for interest rates. However, economists with knowledge of central banking operations from the inside (Bindseil 2004) have rarely if ever accepted the banking multiplier theory, and professionals with experience of bank lending and liquidity management decisions have always understood it to be a fallacy (Goodhart 2009).

Bindseil, a prime example of a central banking insider, has produced a comprehensive work on the history and economics of modern central banking (Bindseil 2004a). In it, he explains the growing attraction of Phillips' banking multiplier theory to economists after 1920 as being down to its mathematical foundations; its consistency with the orthodox neoclassical understanding of money as a commodity in limited supply (what Goodhart [1998] describes as the M-theory of money); and an idealised view of the operations of the gold standard. Recently, central banks themselves have published papers confirming that the banking multiplier is a fallacy (McLeay et al. 2014).

The banking multiplier theory, once accepted, biases economists towards the view that it is possible to control the monetary base, and that money base control facilitates control over credit creation and measures of the broad money supply. It takes the price of money – interest rates – out of the policy story, and allows economists to imagine interest rates to be entirely endogenous market-determined variables, for which central bankers can then deny responsibility. This led to a shift away from simple discount lending by the central bank (what Bindseil more correctly called 'Lombard lending') for the purpose of interest rate maintenance, towards a reliance on open market operations in government securities and other instruments, ostensibly to manage the monetary base. This is a shift which Minsky argued to be detrimental to the prudential supervision of the banks, and a contribution to increasing financial instability, as it lessens the oversight that central bankers maintain over the balance sheet positions of individual commercial banks (Minsky 1986, pp 52-53).

Bindseil, however, points out that in his long experience in the Bundesbank, and later in the European Central Bank, the banking multiplier theory was never so much as discussed.

> **"For at least seventy years, the money multiplier has provided the common denominator of almost all monetary economics textbooks. For instance, Mishkin (2004) still devotes forty pages to it. This is in marked contrast to central bank practice. At least since joining central banking in 1994, the author has never heard any reference to the money multiplier in internal discussions on policy decisions or in public announcements from central banks, in particular not with regard to open market operations."**
>
> (Bindseil 2004a, p 21)

He also explains that open market operations have always been designed to manage policy interest rates, and that modern repo operations are equivalent to discount ('Lombard') loans, with the one difference being that they are banking system wide, rather than aimed at particular institutions, which is what Minsky saw as significant.

An implication of this is that central banks, across the twentieth century, evolved practices which allowed them to compromise between the impractical ideas of many academic economists, and the realities of day to day central banking and monetary policy operations. Since these practices are substantially still in place today; serve no essential purpose and are

inefficient; and only veil the realities of policy making, a switch to more transparent procedures is long overdue.

Fischer and Easterly then describe, and implicitly accept, the standard monetarist story:

'The printing of money at a rate that exceeds the demand for it at the current price level creates excess cash balances in the hands of the public. The public's attempts to reduce excess cash holdings eventually drive up the overall price level, until equilibrium is restored' (p 131).

Even today, in a world where, for practical purposes at least, New Keynesians such as Fischer have accepted the endogeneity of money, and the role of nominal short term interest rates as a policy variable, the above paragraph remains the standard mainstream view of 'money financed budget deficits', or the use of 'seignorage' (as it is sometimes called).

Modern monetary theory brings into question the use of the term 'printing of money'. The term implies a significant increase in the supply of cash in circulation. The amount of cash in circulation depends on the demand for it from the non-government sector. Friedman's 'helicopter money' is a metaphor we can now dismiss from our discourse as misleading and therefore harmful. The very large expansion of the balance sheet of the Federal Reserve in the US since the global financial crisis has been accompanied with no significant impact on currency at issue or broad money, so 'money printing' is the wrong term to use.

A modern money theorist would counsel against the use of foreign currency denominated debt by a monetary sovereign, as a way to compromise your sovereignty. The purchase of domestic currency denominated government debt, or the holding of domestic currency, by the foreign sector is a foreign sector portfolio decision, and so, in the absence of regulations to limit or prohibit foreign investors from holding domestic currency financial assets, outside the control of the government. It has been a recent feature in the market for Australian Commonwealth Government securities, the majority of which at the time of writing and for almost the whole of the past decade have been held by foreign sector investors. This has implications for the foreign exchange market, but none for government solvency. In this sense, it does not need to be distinguished from debt issuance to the domestic private sector.

We can reduce and rewrite the fiscal policy identity as

$$\textit{Deficit} = \textit{Net reserve creation} + \textit{Net bond sales} \qquad (6.3)$$

Of course, reserves are also created or destroyed by the central bank trading with or lending to the non-government sector. For equation 6.3 to be an identity, the central bank would need to be incorporated into the consolidated government, with net purchases of assets from the private sector by the central bank classified as government spending.

The rewritten identity, in its simplicity, allows us to contrast the modern monetary theory perspective with the neoclassical perspective. Modern money theorists, as I have already said, make the following points:

- A government deficit implies a net financial surplus for the non-government sector (incorporating the foreign sector into the non-government sector), as shown in Godley's three balances approach to the national income identity.

- The non-government sector financial balance, given by private sector saving net of private sector investment plus the current account balance, is dependent on private sector and foreign sector behaviour. While it can be influenced by the government, it cannot be determined or closely managed by the government sector. However, in an economy with a rising Nominal GDP and a robust financial system, the private sector will need to net save, to maintain a normal ratio of net financial assets to GDP. There will be exceptional periods when this is not the case, for example when financial deregulation and asset price bubbles encourage negative private sector net saving. However, these periods have historically been associated with growing financial fragility.

- The foreign sector financial balance is the negative of the current account balance, and, for a monetary sovereign, is dependent on foreign sector net demand for domestic assets. In some countries, such as Australia, foreign portfolio preferences can generate a persistently positive foreign sector balance, or current account deficit,

over a very long period. Australia's annual current account balance has been in deficit continuously since 1973, including the Howard-Costello fiscal surplus years.

This means the fiscal position is highly endogenous – all these variables are partially endogenous and inter-dependent, but logically the direction of causation is principally towards the fiscal budget and not from it. Governments aiming to follow the orthodox prescription to 'balance the budget over the cycle', or aiming for European Stability Pact-style budget and debt ratios, may only be able to do so at the risk of promoting private sector financial instability, or by a China or Germany-style current account surplus to export that instability to their trading partners.

With an endogenous fiscal balance, which must be allowed to evolve to whatever level is consistent with full employment, if full employment is the objective, then, given the behaviour of the other sectors, it makes no sense to discuss structural budget positions (at least not in the sense used by orthodox economists). It also makes no sense to have a 'balanced budget' or 'budget surplus' strategy. Governments pursuing these objectives generally fail to meet them, because of the endogeneity of the fiscal balance, and the austerity policies involved in their pursuit encourage either the opening up of an output gap or asset bubbles and financial instability. This is the experience now of a number of natural policy experiments in recent years. It is also the logical implication of Post Keynesian stock-flow consistent models, deliberately based on a high degree of institutional realism, produced by Godley and Lavoie (2007), and others.

Returning to the simplified identity (equation 6.3), we are now able to discuss this relation not as a policy constraint, but as an identity describing the counterparts of a largely endogenous fiscal position.

Fischer and Easterley view net reserve creation as especially inflationary, and bond sales as leading to crowding out of private sector investment (and perhaps consumption) through rising real interest rates and (in the background) Ricardian equivalence and the permanent income hypothesis. There are several intertwined misconceptions here, and confronting them is like untying a very complex and tangled knot.

Every item of government spending initially leads to net reserve creation. This is a simple and institutional fact. It is possible to define an even simpler 'ex-ante' fiscal identity, assuming government net spending has place and has not been matched by net bond sales.

Deficit = Net reserve creation (6.4)

Equation 6.3 can then be described as an 'ex-post' fiscal identity.

Unless or until tax or other payments to the government reduce reserves again, the consolidated government sector (incorporating the Treasury and the central bank) has a choice about whether to leave reserves in the system or to make net bond sales to remove

those reserves. The significance of this decision depends on whether interest payments are made by the central bank on bank reserve accounts – or excess reserves, when there is a minimum reserve requirement – and on the relationship between the interest rate paid on these funds and the policy rate.

If, as used to be the case, no interest is paid by the central bank on reserves, then bond sales from within the consolidated government sector are essential for interest rate maintenance, in order to drain excess reserves from the system, once government spending has increased those reserves. Leaving excess reserves in the system drives the overnight inter-bank lending rate, which is the normal policy interest rate, down to zero. This is the reason modern monetary theorists sometimes provocatively refer to a 'natural rate' of interest of zero. In the absence of net bond sales, by the treasury or the central bank (for practical purposes, the distinction is unimportant), deficit spending leads to a cash rate (Australia), or federal funds rate (USA), of zero.

This statement, which is accepted as factual within what has until recently been the standard framework by those with experience of central banking operations, is still sometimes confronting for neoclassical economists. It directly contradicts notions of 'crowding out', which is still loosely anchored in a loanable funds view of interest rates, and which emphasizes that short term nominal interest rates are exogenous policy variables for a monetary sovereign. For practical purposes, this has for twenty years been accepted within the neoclassical synthesis, with the Taylor Rule, as I explained in chapter two, used in an attempt to once more endogenise what is clearly exogenous, and to re-institute crowding out.

Fischer and Easterley then address 'debt dynamics', or what is now often (misleadingly) called 'fiscal sustainability'. They define the debt ratio (d) as the ratio of government debt to GNP. They of course exclude base money from their definition of government debt, as remains standard practice for neoclassicals. The notation they use for what is the result of a very commonly reproduced piece of algebra paper is a little cumbersome. I will rewrite it as follows:

$$d_t = def_t + \frac{(1+r_t)}{(1+g_t)}\, d_{t-1} - m_t \qquad (6.5)$$

where def_t is the primary deficit, excluding interest payments, across year t; $r_t$is the average real rate of interest paid across the year on government interest-bearing liabilities; g_t is the real economic growth rate; m_t is the ratio of non-interest bearing monetary financing (or 'seignorage') relative to GNP; and d_t and d_{t-1} are the net debt to GNP ratios at the beginning and end of year t.

They then assume the real interest rate on government debt exceeds the growth rate in Real GNP, and conclude that 'the debt dynamics are unstable', since there are presumed to be limits on the available and non-inflationary degree of 'seignorage', in which case with r> g, and in the absence of a primary fiscal surplus, the value of d continuously increases until the market for government debt goes on strike.

> **"At some point it will be impossible for the government to sell its debt, and the process will have to be brought to an end by cutting the budget deficit. The point at which the process has to end depends on the expectations of the public. When the public recognizes the unsustainability of the government's fiscal policy, it will cease buying government debt and thereby force a change in policy."**
>
> (Fischer and Easterly 1990, p 135)

This passage would be unchallenged by virtually all orthodox neoclassical economists, up to and including the present day, including Reinhart and Rogoff, and even perhaps Krugman. It implies, if true, that the government does face a purely financial inter-temporal budget constraint. In fact, it is true, for non-monetary sovereigns such as Spain, France, South Australia, or California, where no seignorage exists (so that $m_t = 0$), and if no monetary sovereign guarantees to act as a 'buyer of last resort' for issued debt securities.

It is false and misleading for a monetary sovereign government, such as the federal or central governments of the USA, Australia, Japan, or the United Kingdom. Austerity policies, where used, and absent a growth in net exports or an acceleration in private sector debt, consign economies to a long period of output gaps and unnecessarily high unemployment and underemployment. A failure to understand modern money amongst policy makers and their advisors leads to a failure to pursue the public good.

Firstly, ‘seignorage’ equates to an increase in base money, a proportion of which will take the form of currency at issue (and so be non-interest bearing). But in a modern system, the rest of the increase in base money will, under current arrangements, be exchange settlement funds (or operational balances) held at the central bank, and in receipt of interest.

Both ‘seignorage’ and government security issuance involves the emission of financial liabilities by the consolidated central government. Even the distinction between non-interest and interest bearing liabilities isn’t useful any longer in this context. There is, therefore, no point in making a distinction at all.

Exchange settlement funds are sight deposits with the consolidated government: government bonds are term deposit with the consolidated government. Government bonds should be viewed as a form of broad ‘outside’ money – a highly liquid store of value. The government does not need to make net issues of bonds to ‘finance’ its deficit and debt. Bond issuance is required under current Australian arrangements to maintain the cash rate at its target level, rather than allowing it to fall to the lower interest rate paid on exchange settlement funds by the Reserve Bank of Australia. Government bonds have other functions too, as I have already acknowledged – but those functions are to meet the needs of the non-government sector and of financial markets as they are currently organised.

It is not essential to public finance to make net sales of government bonds at all, and indeed, I propose to replace such securities with term deposits at the central bank, in order to set the

pure term structure of interest rates and to offer nominally risk free financial assets to the non-government sector.

The standard response to this is to argue that this alternative involves large scale 'money printing', which is claimed to be more inflationary than bond issuance, and which places a limit on the extent to which a deficit can be financed through 'seignorage'. It is now widely accepted that the banking multiplier process is a fallacy (see Bindseil's comments above, or the Bank of England paper I have cited, or Goodhart's 2009 paper); that bank lending and deposit creation is not restricted by a reserve supply constraint; that it is not possible for central banks to limit the supply of reserves and to maintain stability in the overnight cash market; that increases in bank deposits create an increased demand for reserves ,and not vice versa; and that, therefore, any statistical relationship which might exist in what are often called 'normal times' between bank reserves and broad money, is a 'banking divisor', and not a multiplier (Lavoie 1992, p 208).

Once interest is being paid on settlement reserves held at the central bank, then they are not functionally any different from interest bearing government securities, and should not be regarded as such. You could argue for setting the *m* term in equation 6.5 to zero, which is what orthodox economists often do anyway, when they rule out monetary financing on principle. Alternatively, you could define all government financial liabilities as monetary, which is what I argue for, in which case the very idea of monetary sovereign debt, in its own currency, is redundant.

The central bank is in a position to determine the average rate of interest paid on such government domestic currency liabilities. Hence, there is never a requirement to set a real rate of interest on these liabilities above the rate of growth of the economy, and as indicated above, there is an argument that the 'natural' rate of interest ought to be zero. This has implications for the use of taxation to limit inflationary pressures and for exchange rates, but none for government solvency.

Equation 6.5 can be rearranged to show that the debt ratio is not explosive, even when the real rate of interest on government liabilities is above the growth rate; at least, if we assume an economy with an output gap, or where government net spending is always set to maintain aggregate demand at its non-inflationary full employment level.

Setting monetary financing at zero, as suggested above, and defining $-def$ as the primary fiscal surplus, we obtain:

$$-def_t = d_{t-1}\ \frac{(r_t - g_t)}{(1+g_t)}\ \textit{(for } d_t = d_{t-1}\textit{)} \qquad (6.6)$$

This can be rewritten as:

$$s_t = d_{t-1}\,\frac{(r_t - g_t)}{(1+g_t)} \qquad \textit{(where } s_t = -def_t\textit{)} \qquad (6.6a)$$

For example, suppose at time t-1 that GDP = $10tn and there is an 80% debt ratio. This implies a government net debt of $8tn. If the real rate of interest on the government's debt is 5%pa and the economy is growing at 3%pa, then (6.6a) implies that a primary surplus of approximately 1.55% of GDP would stabilise the debt ratio. At time t, GDP will be $10.3tn, and net debt will have risen to approximately $8.245tn. The debt ratio will remain at 80%.

This primary surplus will not be the result of government austerity, pushing output below its full employment level. It will be the result of setting the overall fiscal deficit at whatever level is consistent with full employment. I will return to this result in my next chapter, in the context of Godley and Lavoie's stock-flow consistent analysis of the macro-economy. My final chapter will examine a job guarantee, as a mechanism for bottom-up fiscal policy, designed to determine the appropriate level of the overall fiscal deficit for full employment, without the need for fiscal fine tuning.

It is now clear that the crude description of quantitative easing in the USA and elsewhere after the financial crisis as 'money printing', and as a potential source of inflationary pressures common amongst non-economists, and even among some eminent orthodox economists such as Meltzer (2013), was misleading. Increasing the reserves of the banking system does not have a multiplied impact on broad money, because credit creation does not require the prior acquisition of federal funds (exchange settlement funds in Australia). Banks will always create deposits to lend to borrowers believed to be credit-worthy, at the market rate of interest, regardless of their reserve balance position. It is interest rates which provide the micro-economic foundation for understanding credit creation decisions, and not the supply of base money. Bindseil (2004a) makes the point that the monetarist banking multiplier story has no micro-economic foundations, which he finds ironic, given its acceptance by real business cycle theorists, who insisted on such foundations elsewhere in their models.

Authors like Fischer and Easterly counter with references to periods of hyper-inflation, and a correlation between these episodes and very rapid expansions of base money, which is what they attempted to show in their 1990 paper. However, once again there is a problem with causation here. Excess spending, including excess spending caused by government expenditure, can of course be a source of demand pull inflation. The great majority, and perhaps all, hyper-inflationary episodes, however, have been consequences of problems with the supply side of the economy – a collapse in productive capacity, often combined with social conflict inflationary pressures as real output per capita shrinks. This was the case in Zimbabwe in 2008, when forced evictions of farmers and a major decrease in agricultural productivity was one of a number of factors combining to drive prices up. It was also true in Germany in

1923, with a combination of lost productive capacity during and after the War, and egregious war reparations required in gold (Mitchell 2015, pp 384-389).

If, under these circumstances, the government increases the nominal value of its spending to accommodate price increases, then there is the potential to drive prices up at an accelerating rate and to generate a hyperinflation, with all that implies. The only practical way to increase government spending as quickly as this is to use monetary financing ('seignorage'). However, it is not the act of reserve creation which is the cause of the hyperinflation.

Fischer and Easterly conclude that 'both theory and evidence tell us – and warn us – that large budget deficits pose real threats to macroeconomic stability and, therefore, to economic growth and development'.

This was untrue in 1990, taken out of context of the level of effective demand relative to the productive capacity of an economy, and it is more clearly untrue in 2016. There have been numerous examples of financial crises and macroeconomic instability in countries where governments have not run prior fiscal deficits, and certainly not ones that could be described as 'large'. There is some evidence that fiscal surpluses are more associated with subsequent recessionary episodes, consistent with the fact that government surpluses drain net financial assets from the private sector, and tend therefore to weaken private balance sheets, in the absence of a current account surplus. More to the point, Japan is one country which has run large fiscal deficits over what is now a very long period, without any apparent threat to

stability – in spite of persistent warnings from orthodox economists and credit ratings agencies to the contrary.

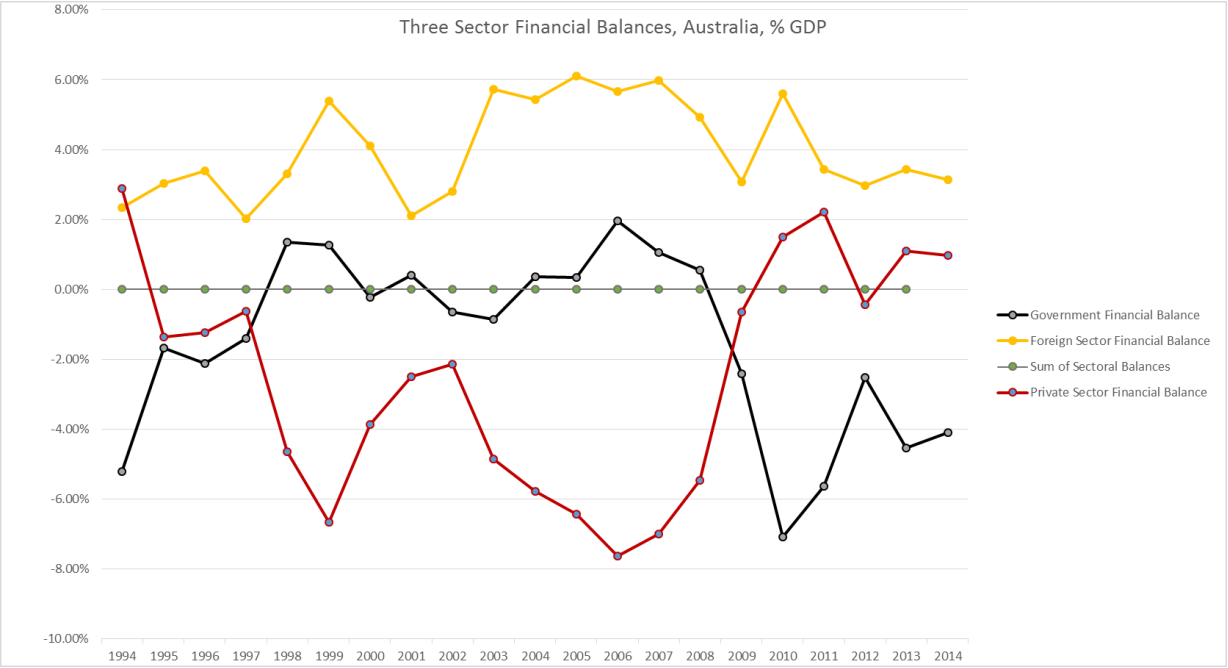
In fact, the less successful episodes in the Japanese economy since the 1990s have tended to be associated with ill-advised measures designed to unnecessarily reduce the government's budget deficit. An increase in sales tax during 2014 is the most recent example. Mosler, Wray, Mitchell, and other modern money theorists have pointed out that rare fiscal surpluses in the USA have apparently been correlated with imminent recession (Wray 2003, pp63-66). More generally, an economic downturn endogenously drives the government balance into deficit, as everyone knows. The fiscal position of a monetary sovereign should be allowed to evolve to maintain full employment as the financial balances of the non-government sector of the economy shift over time. It is inappropriate to set any target for the fiscal balance or the (net or gross) debt ratio, as the appropriate fiscal balance for non-inflationary full employment will be determined outside the government sector.

6.7 Government and Non-Government Financial Balances

The accounting relationship between government and non-government financial balances, and the partial endogeneity of government budget balances can be illustrated with respect to any country over any period of time. After all, accounting identities must always hold. The

following chart describes the annual financial balances of general government, the private sector, and the foreign sector, for Australia, between 1993/4 and 2013/14.

Figure 6.1: Three Sector Financial Balances – Australia, 1994-2014



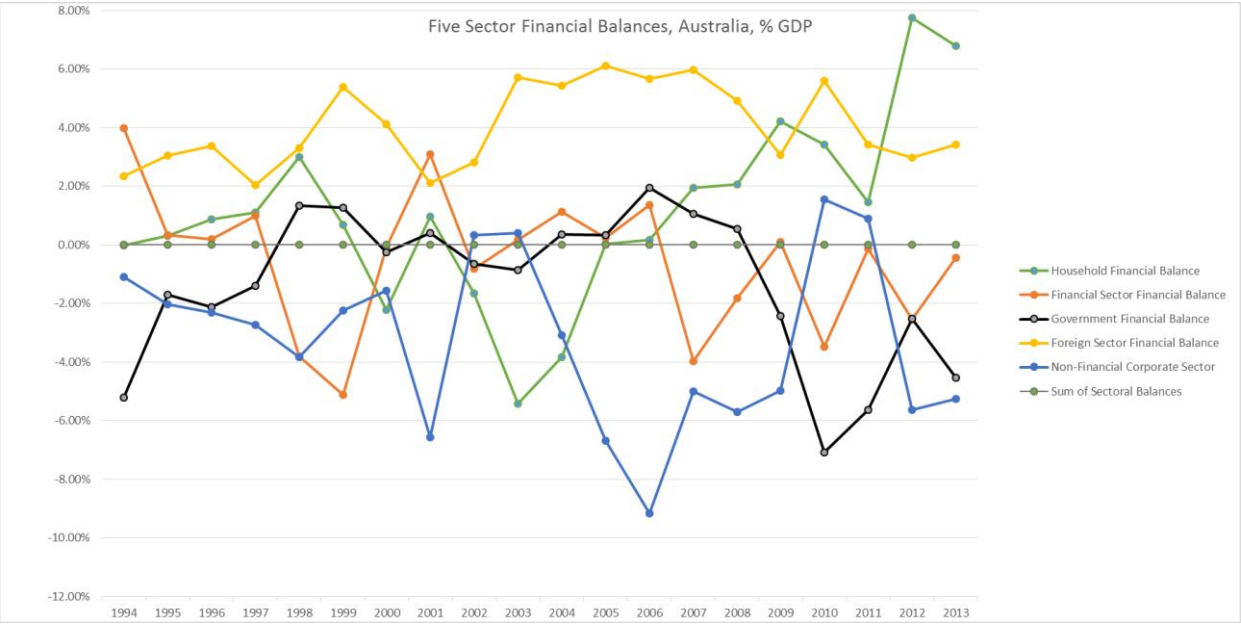
Source: Australian Bureau of Statistics

While the balances always, by definition, sum to zero, accounting identities do not determine causation. In practice, each balance is both the cause of and caused by changes in the other balances. However, it is a fact that neither the foreign sector net financial balance, which is the counterpart of the country's current account balance, nor the private sector net financial balance, which is private sector net savings, can be determined by government. They can be influenced, but they cannot be determined by government.

The foreign sector financial balance depends on the desire of the rest of the world to accumulate net financial assets in Australia. For many years, the foreign sector has wished to make net acquisitions of Australian assets, which is the principal cause of Australia's negative net international investment position. It has supported the Australian dollar at a higher real exchange rate than would otherwise have existed, and consequently boosted Australian real incomes.

The private sector net financial balance can be broken down into households, non-financial corporations, and financial institutions:

Figure 6.2: Five Sector Financial Balances – Australia, 1994-2014



Source: Australian Bureau of Statistics

Historically, in Australia and around the world, households have tended to be in net financial surplus (net saving), while non-financial corporations have been in net financial deficit (net investing). The same time, financial corporations have been close to balance, and the Australian private sector overall has also been close to balance. It does not always have to be this way. In the USA, the private sector as a whole has tended to run net financial surpluses, for many years.

Should the private sector desire to net save, at a full employment level of income, then given the desires of the foreign sector to net lend, there is, as I have already said, a unique fiscal outcome for the government sector which will support demand at the full employment level. Since both the private sector and the foreign sector wish to be net lenders on the financial system, the government must offset these desires by being a net issuer of liabilities. If the non-government sector desires safe Australian dollar financial assets, then the government sector must supply them.

In the event of an incipient recession, when private sector savings rise relative to private investment, the government sector can either run a deliberate fiscal deficit, through discretionary measures designed to boost demand and maintain full employment, or be faced with an endogenously driven deficit, as the economy and tax receipts contract. In these circumstances, the choice is not whether to avoid a fiscal deficit, but which kind of fiscal deficit to run.

The experience of Australia, the USA, and Euro-zone countries, after 2008, is indicative of the validity of this argument. Based on Treasury data, a discretionary stimulus kept Australia out of an official recession (McDonald and Morling 2011). The former US Treasury Secretary, Timothy Geithner, argues persuasively that fiscal stimulus helped to support the US economy, but that, mainly for political reasons, the stimulus was not large enough to do more than that (Geithner 2014, p 372). Meanwhile, attempted austerity in Euro-zone countries did not prevent ratios of debt to GDP rising, as fiscal deficits were driven upwards by falling GDP (Mitchell 2015, chapter 16, pp 244-284).

This is not an argument for fiscal fine tuning, which in an uncertain economic environment is not guaranteed to stabilise an unstable economy. It is an argument for the fiscal balance, as much as possible, to automatically react to changes in private and foreign net saving, in order to maintain the economy at or near full employment. While a strongly progressive tax and welfare system can be a part of this, for most modern money theorists, an effective job guarantee scheme is the key.

The deliberate pursuit of fiscal surpluses has usually been advocated by orthodox economists, on the basis that such surpluses create 'fiscal space' in the event of a recession, and contribute towards confidence and financial stability.

From a modern money perspective, the opposite is likely to be the case. Firstly, in an economy such as Australia's, or in recent times the US, a government financial surplus requires a private

sector financial deficit. If the corporate and foreign sectors are not collectively in financial deficit, this means households must be driven into deficit, to make a government budget surplus a possibility.

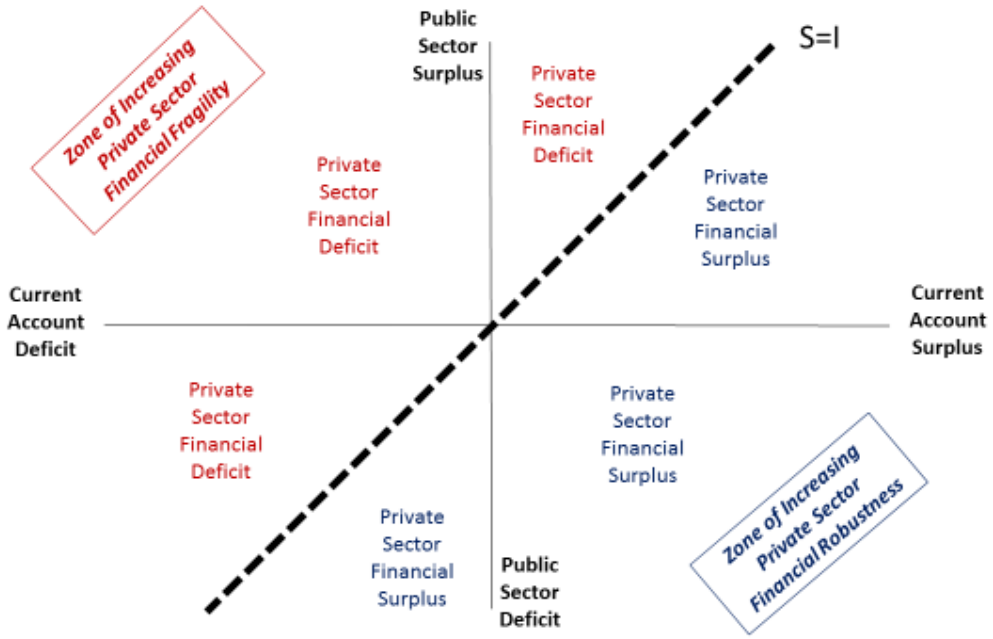
This encourages financial deregulation and a permissive and relaxed attitude to the build-up of household debt. It implies weakening household balance sheets, which can be disguised by apparent capital gains on volatile speculative assets, such as equities or property, and is associated with Minskian financial fragility. Draining safe net financial assets from the private sector through running fiscal surpluses either depresses aggregate demand, or leads to rising private debt.

In the US, the association between the rare government budget surpluses of the Clinton years; the short recession of the early 2000s; the private debt-driven recovery; and the Great Recession, is indicative of this. In the case of Australia, the role that private sector, and especially household, debt played in allowing the Howard Government to 'achieve' its fiscal surpluses is clear (see Figure 3.4). The desire of the Government to operate a fiscal surplus, and the use of monetary policy and a relaxed attitude towards financial innovation and deregulation were self-reinforcing.

The lesson to be drawn is that it is not monetary sovereign government fiscal deficits which are unsustainable, in the sense that such governments can never become insolvent and such deficits do not directly cause inflation. It is fiscal surpluses that are often unsustainable, in that they require a build-up of private debt and deteriorating private balance sheets masked by speculative capital gains, or a trade surplus, which just exports the problem to another country.

The available fiscal space for a monetary sovereign is illustrated in the following graph (Figure 6.3), which was devised by a modern monetary theorist named Rob Parenteau (2010).

Figure 6.3: Fiscal Space and Financial Fragility: the Parenteau Chart

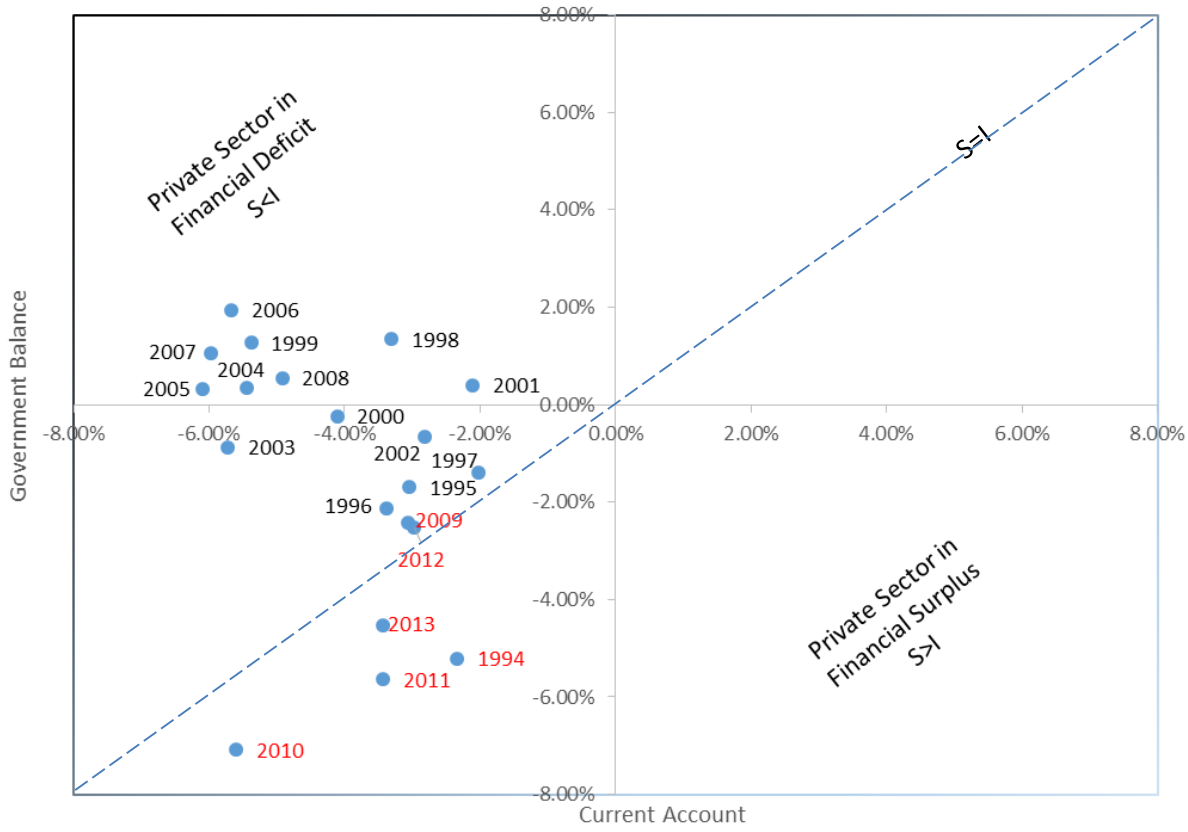


Any economy, at any point in time, can be positioned on this chart. The important point is that a consistent position above and to the left of the diagonal implies negative private sector net saving, and potentially growing financial fragility as private sector balance sheets become more speculative.

With reference to Australian flow of funds data from 1994 to 2013 (see Figure 6.4), the Parenteau chart clearly identifies the growing fragility of private balance sheets in Australia from the mid-1990s up to 2008, with the fiscal balance being either in surplus, or the deficit being insufficiently large to offset the country's overall deficit on its current account. It is admittedly a simple accounting identity that is being represented, but nevertheless the financial trends, in Australia and in many other countries prior to the onset of the global economic crisis, are at variance with the way in which the Howard Government era in Australia is generally described. It was not a period of fiscal sustainability and economic stability. It was a period of rapidly increasing private debt, and especially household debt, and growing national financial fragility.

When the global crisis struck, a discretionary fiscal stimulus going well beyond the use of automatic fiscal stabilisers to mitigate the economic downturn allowed the private sector to move into financial surplus, without the corresponding increase in the household saving ratio that drove the move into private sector surplus triggering a serious recession.

Figure 6.4: Australia's Parenteau Chart: Pre- and Post-GFC



Source: Australian Bureau of Statistics, Flow of Funds Accounts

The above discussion is reinforced by an understanding of the general principles of modern central bank operations, as they were prior to 2008, and as they have evolved since then. There is significant overlap here between the views of economists who are central banking or regulatory insiders, rather than university academics (Bindseil 2004a; Borio & Disyatat 2009); of Post Keynesian academics who are reluctant to self-identify as modern money theorists

(Lavoie 2010; Goodhart 2010); and of modern monetary theorists with a special interest in central banking (Fullwiler 2008).

6.8 Fullwiler's Ten Principles of Modern Central Banking Operations

An excellent starting point is the ten 'general principles' of modern central bank operations identified by Fullwiler in June 2008, just prior to the failure of Lehman Brothers and the subsequent changes in the operations of the Fed. These principles have long been widely understood by those with experience of central bank operations, but have often been misunderstood or ignored by very eminent academic economists. This includes Milton Friedman, whose influence was instrumental in driving an unsuccessful policy experiment in the USA in 1980, which should have been avoidable, given an understanding of the principles.

From there, I will draw on Lavoie's 2010 discussion of changes in the operations of the Federal Reserve in 2008-9, and their implications and a Bank for International Settlements working paper from November 2009.

This will lead to conclusions wholly consistent with the core axiom of modern monetary theory, and inform suggestions for institutional reforms to simplify the framework for fiscal

and monetary policy implementation; and for the communication of both the mechanisms of and space for policy; and the development of policy over time.

> "**Reserve balances are held for only two purposes: payments settlement and (where applicable) meeting reserve requirements. Reserve balances do not 'fund' loans or otherwise aid the creation of outside money."**
>
> (Fullwiler's First Principle)

The first principle directly contradicts the banking multiplier story, as recounted in virtually all orthodox text books, and occasionally even now in other orthodox publications. The banking multiplier rests on the notion that banks are limited in their ability to create credit by the supply of reserve balances. This is not the case now, and has not been the case for many years. Banks do not require reserves on account at the central bank prior to the creation of credit, and there is no relationship between lending decisions and the management of reserve balances. Banks create credit for customers with good credit ratings who are prepared to pay market interest rates, allowing for the banks' current target interest rate margins. The bank then has a liability equal to the deposit which has been created, and an asset equal to the loan.

Banks require reserve balances for payments settlement. Where credit creation leads to a net transfer of reserve balances away from a bank, the bank will generally seek to replenish those reserves through overnight inter-bank borrowing on the cash market, or by issuing other money market liabilities or running down money market and other liquid assets. The bank

also has the option of borrowing overnight from its central bank, at what is often called the discount window.

Many central banks abandoned the use of settlement reserve requirements during the 1980s or 1990s. One reason for this was that reserve requirements were often misinterpreted as a tool for limiting the banking multiplier, which the majority of experienced central bankers have long understood not to be the case. Where reserve balances are remunerated at rate of interest below the target market rate, they act as an effective tax on the banking system, rather than in any sense as a quantitative restriction on the supply of credit

The combination of minimum reserve requirements, with averaging periods over which required reserves can be calculated, and then subsequently over which requirements can be met; also serves to make the demand for reserve balances more interest elastic than would otherwise be the case, at least for every day except the final day of the reserve maintenance period. This facilitates a tighter achievement of the target policy rate with less frequent open market operations by central banks, under what had by the 1990s become the consensus approach to interest rate management.

Central banks operating a settlement system which is simpler and less uncertain, engaging in more frequent open market operations, or relying on the simple approach to interest rate management I will recommend, do not derive any benefit from the operation of such reserve requirements. This is true notwithstanding the recent introduction of a form of bank-by-bank

targeting of exchange settlement reserves in Australia, as part of the transition towards a more fully real time gross settlements payments system (Reserve Bank of Australia 2015).

The key message from the first principle is that reserves do not precede deposit creation and do not limit credit creation, and that therefore the creation of excess reserves will not by itself encourage additional credit creation. This is not only true at the 'zero bound', as many orthodox neoclassical economists still believe, but it is always true. It implies that the expansion of bank reserves is never a source of inflationary pressures. This fact has major implications, which support the core axiom of modern monetary theory. It is important to understand that it is entirely consistent with public statements made by modern central banks (McLeay et al. 2014) and the Bank for International Settlements (Borio & Disyatat 2009). It is a logical consequence of the workings of a modern banking system. Central banks cannot create inflation by 'printing money'. To the extent that quantitative easing was supposed to perform this function, it was bound to fail in its purpose.

> "**As monopoly suppliers of the aggregate quantity of reserve balances, central banks have a fundamental, legal obligation to promote the smooth functioning of the national payments system."**
>
> (Fullwiler's Second Principle)

The second principle relates to the fundamental obligation on all central banks to maintain the domestic payments system. This is surely the most important legal responsibility of a

central bank. Given the huge scale of transactions which are settled using reserve balances, it necessitates the central bank using market operations and/or Lombard lending to continuously ensure a sufficient supply of exchange settlement funds to allow for the smooth operation of the payments system at the desired policy interest rate.

The option of restricting the supply of reserves to the banking system in order to enforce a limit of bank lending, as in the banking multiplier story, is infeasible. Given the inelasticity of demand for balances, any such policy would lead to an extremely high level of interest rate volatility on the money market, and rapidly to financial crisis. Ill-advised policies to limit reserves on this basis have had exactly this consequence, and been either rapidly amended, as during the Volcker monetarist experiment of 1980-82, or reversed, as in China in 2013 (*The Economist* 2013).

As Fullwiler says, 'It is also worth mentioning that central banks face no operational constraint in carrying out such large operations – as they simply involve debiting or crediting balances on the central bank's own balance sheet – even as there might be legal or political constraints to doing so imposed by national governments'.

It is important always to distinguish between constraints which are the logical consequence of how systems must in practice operate, and legal or political restrictions which are by their nature potentially temporary and can be the subject of institutional change.

In Table 2 in his paper, Fullwiler provides a simplified 'typical central bank balance sheet' (Table 6.1).

Table 6.1: A Simplified Central Bank Balance Sheet

ASSETS	LIABILITIES AND CAPITAL
Claims on Domestic Government	Currency in Circulation
Claims on Domestic Banks	Bank Reserve Balances
Net Foreign Reserves	Government Deposits
Other Assets	Central Bank Bills
	Central Bank Capital or Equity

Source: Table 2 in Fullwiler, 2008

He explains that changes in bank reserve balances are the counterparts of other items on the balance sheet of the central bank. Three points are worthy of emphasis at this stage:

- Firstly, central banks are never at risk of insolvency, so that those balance sheet 'risks' which are often described as arising from, for example, lending to domestic banks, are

entirely fictitious. Therefore, any legal or political requirement on a central bank to maintain a positive net asset or equity capital position is entirely unnecessary. Central banks are not required to have a 'positive net worth', and indeed the term 'net worth' in the case of a central bank is entirely meaningless.

- Secondly, to repeat, central bank balance sheets should be consolidated into the general government sector balance sheet. To describe as an asset for the central bank its 'claims on domestic government', or to view 'central bank bills' as somehow distinct from treasury bills, or to describe whatever spreadsheet entry represents the 'balance of the central government' as a liability of the central bank is misleading. The central bank is part of its government – the liabilities of the central bank to commercial banks and others are as much a part of the government's net financial liabilities to the non-government sector as treasury bills or bonds. The central government, including the central bank, *should* have a negative net financial wealth position on its consolidated balance sheet, which mirrors the desired positive net financial wealth position of the non-government sector, and evolves endogenously as the preferences of the non-government sector evolve over time, balancing out those preferences which maintaining full employment.

- Thirdly, to understand the essential relationship of the central bank to the broader government sector in a monetary sovereign, is to understand the logical basis for modern monetary theory, and the logical truth of its core axiom. Unlike the axioms of neoclassical economics, the core axiom of modern money theory really is a fundamental logical truth.

> **"The money-multiplier view in which the central bank engages in direct targeting of reserve balances or the monetary base is untenable in practice. The only possible direct target is an interest rate target."**

(Fullwiler's Third Principle)

The remaining principles listed by Fullwiler follow on from the above. The third principle states something I have already explained, which is that the money multiplier and reserve balance targeting are 'untenable in practice'. Central bankers target (generally, although not always) overnight interest rates, and have done so for virtually the whole period since the development of modern central banking.

> **"Central banks accommodate bank's demand for reserve balances at the targeted interest rate, while in the process offsetting changes in their own balance sheets that would otherwise be inconsistent with such accommodation."**

(Fullwiler's Fourth Principle)

The fourth principle explains that under a system whereby bank reserve balances are remunerated at a rate below the target overnight policy rate, which, in June 2008, was still zero in the USA, and Lombard lending to banks through the 'discount window' is at a rate above the target rate, as is generally the case, the maintenance of the policy rate at its target implies that the central bank must accommodate fluctuations in the demand for reserve balances, so as to maintain their supply equal to banking system demand at the target rate. If it does not, it will miss its target.

Any shortfall of reserves will drive the rate towards the discount/Lombard rate, and possibly above it, if there are 'frown costs' associated with discount window loans, or institutions with reserve balances but without access to the discount window. Conversely, any excess will drive the rate down towards the rate paid on reserve balances, and possibly below it, if interest payments are made on some reserve deposits but not others.

It is notable that this requires, for example, an increase in reserve balances generated from higher government spending to be offset by central bank net sales of government or central bank securities, or other repo transactions designed to drain reserves from the banking system, to prevent the higher government spending forcing the overnight interest rate below its target level. This assumes the interest rate paid on reserves is below the target level. This emphasizes that the essential effect of government bond sales under this system, whether by central bank or by the government itself, is that of interest rate maintenance. It is not in any sense conducted to raise funds to pay for government spending, which would contradict the core axiom of modern monetary theory. It is to hold the cash rate at its target, given an interest rate paid on reserve balances which is below that cash rate.

As Fullwiler puts it, with reference to numerous sources (e.g. Bell 2000, Fullwiler 2005, Mosler 1997, Wray 1998): 'The operations of the Treasury and of the central bank are therefore necessarily interdependent, since in the presence of a fiscal deficit (surplus) either the Treasury or the central bank *must* sell (buy) bonds or otherwise drain (add) reserve balances

in order to avoid the overnight target falling (rising) to the rate paid on reserve balances (penalty rate for borrowing reserve balances)' (p 13).

The setting of the target interest rate to the rate paid on reserve balances removes this motivation for net bond sales during the (normal) circumstances of a fiscal deficit.

> **"Reserve requirements are related to interest rate targets, *not* control of monetary aggregates."**
>
> (Fullwiler's Fifth Principle)

The fifth principle refers to the role reserve that requirements play in assisting central banks with more complex and uncertain settlement systems, to hit their interest rate targets without frequent market transactions. This role becomes redundant once the change referred to in the previous paragraph is in place.

The change is a shift towards paying interest on reserve balances at the policy target rate, as is the case now in the USA and the UK, as well as in Norway and New Zealand, rather than at a lower rate, as is the case still today in Australia, where the rate paid by the Reserve Bank on 'excess reserves' is 25 basis points below the target cash rate. Once this has been put into effect, all the central bank has to do is to ensure the supply of reserve balances is always in excess of the needs of the settlements system. This prevents the cash rate from rising above

target, with the remuneration paid on reserve balances preventing it from falling below that level.

> **"The potential size of deviations in the overnight target from the central bank's target rate is set by the width of the spread or corridor between interest paid on reserve balances and the penalty assessed to borrowing from the central bank"**
>
> (Fullwiler's Sixth Principle)

The sixth principle also becomes redundant under such a system. In Australia, there is a +/- 25 basis point spread between the interest rate paid and charged by the Reserve Bank and the target cash rate. A target cash rate of 2% implies a rate of 1.75%pa paid on reserve balances, and a penalty rate of 2.25%pa charged on overnight lending to banks. In practice, the Reserve Bank is almost always able to hit its target exactly, due to the relative simplicity of the system – with so few significant counter-parties, in contrast to the US banking system – and the daily and intra-daily market operations of the Bank. The Reserve Bank could maintain its target more efficiently, however, by reducing the spread below 25 basis points, or even having a zero spread, or ensuring an excess supply of reserves and moving to the system where the rate paid on these reserves equals the cash rate.

The normal objection to a zero spread is the elimination of the RBA's profit margin, or the exposure of the RBA to additional balance sheet risks. By now, it is clear that these concerns have no logical foundation – they are irrelevant, and a consequence of mistaking institutional constraints for genuine economic ones. The normal objection to the creation of excess

reserves is the inflationary consequences of such an approach. An understanding of the reasons for an unequivocal rejection of the money multiplier theory necessitates a rejection of this objection.

There is no reason not to combine both approaches – that is, maintain the normal provision of excess reserves to the banking system, plus install arrangements where banks are paid interest on their reserve balances equal to the policy interest rate and where solvent banks are able to borrow from the central bank at this same rate. Such an approach, if available to a wide range of counterparties, would eliminate the overnight money market, greatly reduce the complexity of central bank liquidity management operations, and save on transactions costs. It would be simpler, more transparent, and more efficient. It would also, as Minsky (1986) suggested, promote a closer oversight of commercial bank balance sheets by the central bank, where commercial banks seek overnight funds.

> "**There is no 'liquidity effect' associated with central bank changes to its operating target."**
>
> (Fullwiler's Seventh Principle)

The seventh principle rejects the notion that central banks bring about a decrease in money market interest rates by increasing the supply of base money. This is, of course, how an expansionary monetary policy is described in almost all texts. Fullwiler refers to the extensive evidence that this does not occur in practice. Central banks simply announce a new policy rate, and money market rates react to the announcement. In the past, when US interest rate

decisions were not publicly announced, temporary market operations were used to signal a change in the target, but this (in retrospect) absurd approach, which was itself a concession to market fundamentalism and to the fiction that the federal funds rate was market determined and not administered, was abandoned in 1994. Even in those days, increasing the supply of reserves to signal a lower federal funds rate was temporary, and the idea that increases in the monetary base preceded and caused a fall in the interest rate through the invisible hand of demand and supply was profoundly mistaken.

> "**The quantity of reserve balances in circulation is primarily determined by the central bank's method of interest rate maintenance."**
>
> (Fullwiler's Eighth Principle)

The eighth principle is a simple statement of fact. The use of reserve requirements, the frequency of central bank liquidity management operations, and the degree of complexity and uncertainty in the settlements system, alongside the interest rate and 'frown' costs of borrowed reserves, set the demand for reserve balances which the central bank must meet under the corridor interest rate system. Under a system where there is a deliberate over-supply of reserves, and interest is paid on them at the target rate, this principle becomes irrelevant.

> "**Under current operating procedures, the central bank's balance sheet expands and contracts endogenously while these changes neither create nor destroy net financial assets for the non government sector."**
>
> (Fullwiler's Ninth Principle)

The current system, as Fullwiler was writing, was the corridor system, albeit with a rate paid on deposits of 0%. In such a system, as I have already explained, the supply of reserve balances has to evolve to meet private sector demand, and the central bank must adjust its balance sheet to offset any disturbances to the supply of reserve balances arising from fiscal policy or exchange rate policy if it is to maintain a stable policy interest rate. However, central banking operations involve either asset swaps or loans, and so in principle do not affect net financial assets in the non-government sector. Indeed, this is the distinction between fiscal and monetary policy. Fiscal policy measures create or destroy net financial assets in the non-government sector – monetary policy operations do not.

> **"The central bank's interest rate target "matters" because banks use reserve balances to settle payments."**
>
> (Fullwiler's Tenth Principle)

The tenth principle feeds all the way back into the foundations of modern monetary theory. As long as the only way to discharge tax liabilities involves the use of exchange settlement account balances at the central bank, those balances will play a central role in the monetary system and provide the central bank with a mechanism to control short term interest rates. Moreover, should the central bank be prepared and permitted to use its balance sheet for this purpose, its ability to create and destroy government sector liabilities provides it with all it needs to manage the entire term structure of interest rates. The ability of monetary sovereign central banks to control policy interest rates in the future is not in doubt –

regardless of any increase in the significance of private sector clearing systems, private monetary assets, or anything else.

The fact that government money is 'that which is necessary to pay taxes', and the consequent guarantee that government money will continue to sit at the apex of the pyramid of 'money things' is, as Randall Wray puts it, a guarantee of this fact.

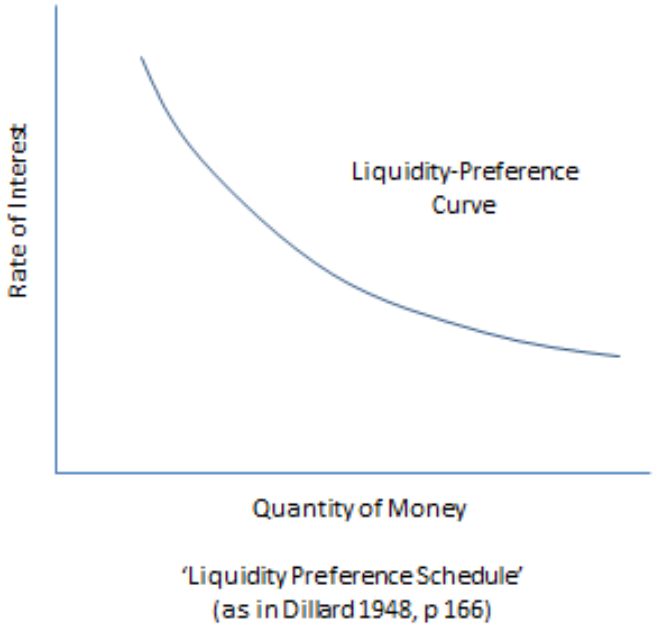
The difficulty some eminent economists have in accepting this, and more broadly the confusion and unnecessary complexity of neoclassical monetary theory, and its 'unfortunate uselessness', ought to be addressed.

6.9 Monetary Policy in the Text Books and in Reality

If we are to discuss these issues, we need to return to a standard first year undergraduate economics course, with its incorrect description of the origins of money, and the consequent treatment of money as though it was a commodity, which I have already explained. We also need to compare the text book story of the money market and the transmission mechanism for monetary policy with a realistic description of a modern monetary system.

The standard depiction of the money market which almost all economists and former students of economics remember from their first macroeconomics course is based on a downward sloping 'demand curve for money' (Figure 6.5), which – and there is no getting away from it – is the curve discussed, if not reproduced, in chapters 13 and 15 of *The General Theory* (Dillard 1948, p166).

Figure 6.5: The Liquidity Preference Schedule of *The General Theory.*



'Liquidity Preference Schedule'
(as in Dillard 1948, p 166)

The gradient of the curve is explained with reference to the speculative demand for money, and in honour of Keynes it is often called the Liquidity Preference Curve. There is generally some attempt to build foundations for the Hicksian IS-LM general equilibrium model, by

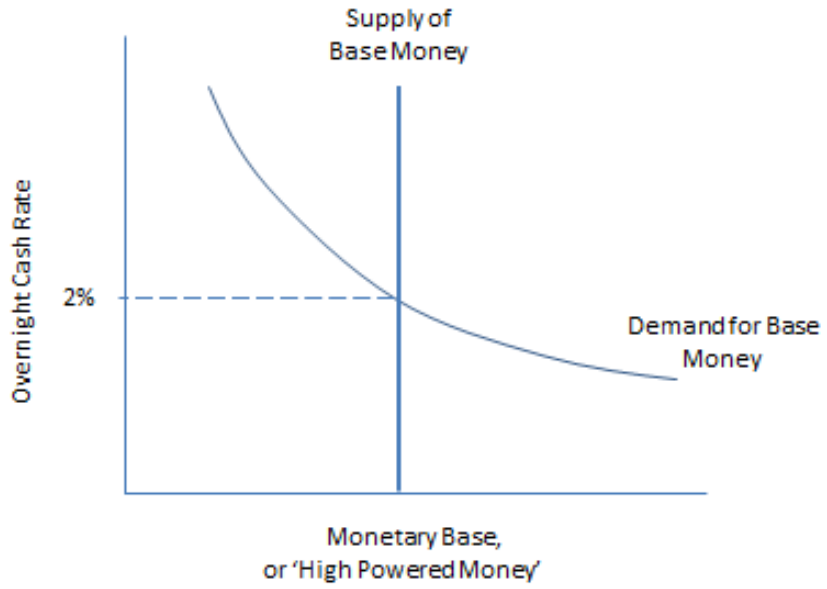
identifying the rate of interest in the diagram as the yield on perpetual, or at least long dated, bonds.

This might as well be designed to confuse and baffle students, as normally no reference is made to the term structure of interest rates, and the diagram is then used to discuss interest rate determination in the short term, or overnight, money market.

The next step in the text book story is an assumption that the monetary aggregate on the horizontal axis is either base money (sometimes, misleadingly, called high powered money, and often denoted by H), or when implicitly based on assuming the money multiplier theory is valid, a broad measure of the money supply.

Assuming that it is base money on the horizontal axis, and the overnight/policy/cash rate on the vertical axis, the 'supply' of base money is represented as perfectly inelastic (Figure 6.6).

Figure 6.6: The Orthodox Money Market Equilibrium Diagram



The cash rate is apparently determined in the money market, by demand and supply. It will, according to the model, increase if there is an increase in the (transactions) demand for money, with no increase in the money supply. This is the logic of crowding out – already written into first year courses, which is ready for reinforcement when the same ideas are discussed in the (marginally) more complex general equilibrium setting of IS-LM, still often taught in the following year.

An 'increase in the money supply' is then described as being based on 'expansionary open market operations'. The central bank decides to purchase 'bonds' from the private sector,

increasing the monetary base and decreasing the cash rate. Confusingly, this is also sometimes discussed as increasing the prices of bonds, and decreasing their yields – this time, potentially confusing a very long term interest rate for a very short term one.

This is clearly a story of exogenous base money. When combined with the money multiplier theory, it provides an apparently plausible mechanism by which the authorities could control the 'money supply'. Increasing the monetary base reduces the cash rate and implicitly all other interest rates. This 'liquidity effect' increases the demand for credit, ensuring additional credit creation and therefore operationalising the money multiplier.

Much of post-war monetary theory included the adding of layers of complexity to this simple, and confused and inaccurate, story. A Tobin-Neo-Keynesian and a Friedman-Monetarist might argue over whether money was mainly a substitute for financial assets, or for assets defined more broadly to include consumer goods. They might differ over the gradients of IS and LM functions, as has been taught to generations of undergraduate students. However, neoclassical economists all accepted the basic framework as valid, and particularly in the US, central bankers often played along.

They played along in the sense that they ostensibly relied on open market operations to manipulate the monetary base, and then left the cash rate to demand and supply, as in the text books. However, they almost always in practice operated with the aim of meeting a short

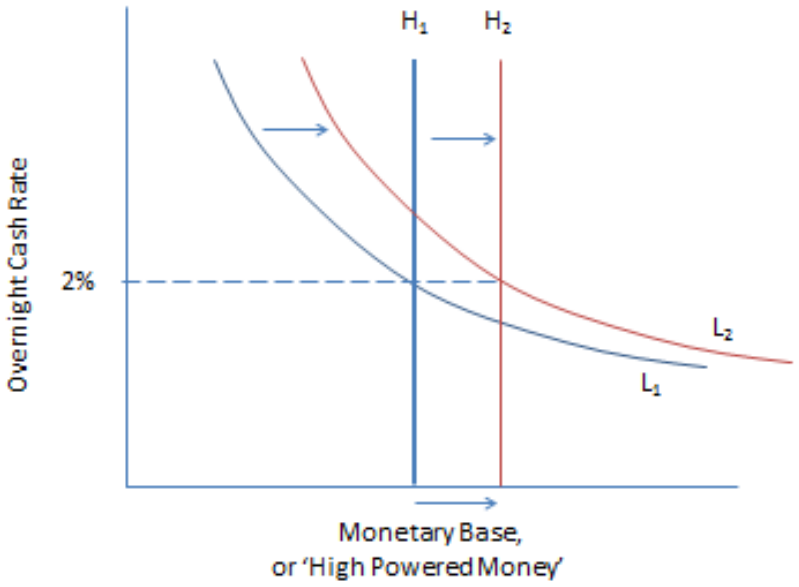
term interest rate target, normally with a high degree of precision, whether they admitted to this or not (Bindseil 2004).

They did not, and could not, control the monetary base, as Friedman and other monetarists often urged them to do. This is because monetary base control, in the sense of managing the level of base money to achieve a precise target for it, or for its rate of growth, is infeasible in a modern monetary system, unless combined with the provision of excess reserves and a target cash rate set equal to the rate paid by the central bank on those excess reserve balances.

This is because it would lead to extreme volatility in money market interest rates, and be disruptive to the whole financial system. When central banks have tried to target bank exchange settlement reserves, or base money, as during the Volcker monetarist experiment in the USA from 1980-82, or very recently (and very briefly) in China in 2013 (Economist Magazine 2013), interest rate volatility and potential financial crisis have quickly led to the abandonment of this strategy. The brief experiment in China can be seen as a brief triumph of neoclassical education over long experience.

Volatility in the demand for liquidity in the banking system can be illustrated using the standard 'liquidity preference' diagram (Figure 6.7). The shift in the demand curve for base money from L_1 to L_2 must be met by an accommodating shift in the supply of reserves and of base money from H_1 to H_2, to hold the cash rate at the central bank's target level.

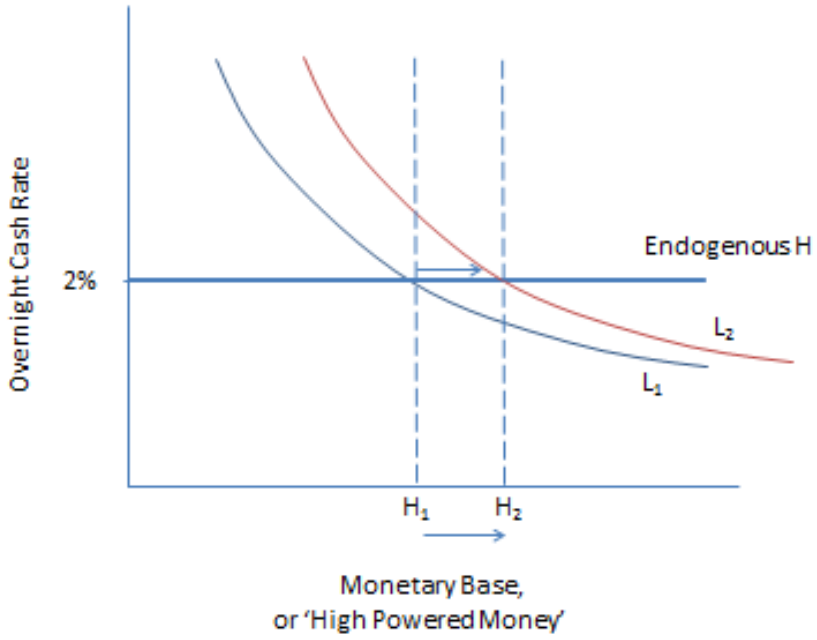
Figure 6.7: Central Bank Accommodation of an increase in the Demand for Base Money, in the Orthodox Diagram



This makes base money endogenous, as Post-Keynesians have pointed out for many years. Moore (1988), in an important work, argued that the representation of base money using a vertical supply curve was misleading, and that endogenous reserves imply a horizontal or perfectly elastic supply of base money at the target cash rate (Figure 6.8). There was a subsequent debate between Post Keynesians about whether the curve can genuinely be regarded as horizontal. It is now generally recognised that this debate was about nothing substantial, and to an extent reflected a confusion between the supply of reserves and the

supply of credit in the banking system. The debate has essentially been resolved in Moore's favour (Wray 2007).

Figure 6.8: The Horizontalist View of Monetary Policy.



The fact that central banks target interest rates, and vary the supply of reserves in order to do so, was so obviously the case by the late 1980s that in the early 1990s orthodox neoclassical economists quietly accepted Moore's view, and incorporated endogenous money into what became the modern DSGE model. This meant dropping 'the money supply' from their model, and replacing it with the policy interest rate.

The notion of an exogenous interest rate does not sit well with general equilibrium theorising, however, since it leads to instability within the model, and potentially accelerating inflation (Sargent & Wallace 1975). Consequently, they re-endogenised the policy interest, as Goodhart (2009) has said, by using the Taylor Rule approach, as discussed in chapter 2. For a central bank applying an inflation target and some kind of Taylor Rule, the rate of interest becomes endogenous again, and the idea of a 'natural' equilibrium real interest rate, determined in a Wicksellian general equilibrium framework, is restored. For a neoclassical economist, the setting of a policy interest rate is a choice which may be preferred to base money targets in an environment where there is day to day volatility in the demand for reserve balances.

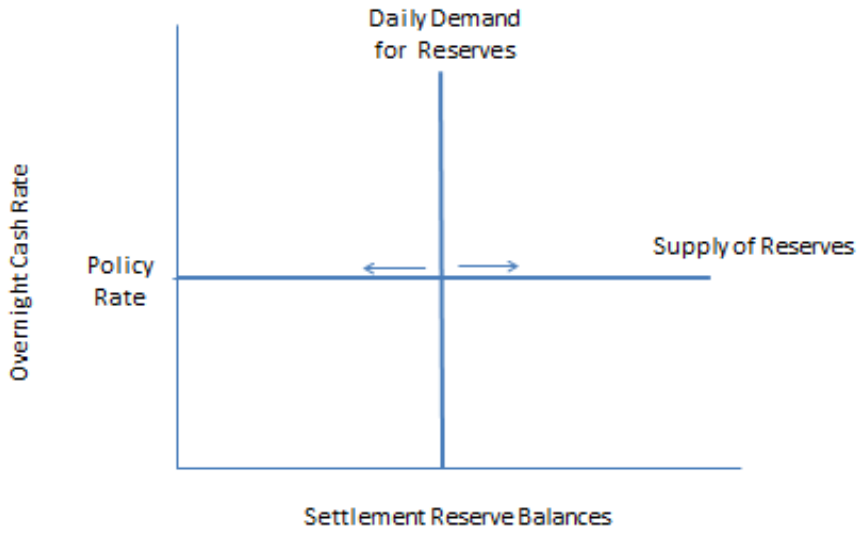
For a horizontalist Post Keynesian, there is no real choice. In any event, changes in reserves and in base money are themselves a reflection of changes in the demand for credit in the broader economy, or the interaction of government and non-government balance sheets. To the extent that monetary policy has any real impact on economic activity at all, it works via the interest rate channel. The quantity of reserves has no more significance than that.

The standard text book demand curve for money, even when supplemented by this horizontal supply curve of reserves, remains inadequate and misleading when used as a basis for discussing day to day liquidity management and monetary policy implementation by central banks.

It is important to understand that, in the absence of reserve requirements, and assuming for the moment discount window lending by the central bank and no interest payments on bank reserves by the central bank to the banking system, the demand curve for reserves on the part of the banking system, at least in the short run, is virtually perfectly inelastic. Banks will collectively require reserves reflecting the complexity and uncertainty of the overnight payments system. Canada and the USA are two extremes in terms of complexity and uncertainty, with the Canadian system virtually removing the need for bank reserves, while a US-style system under these circumstances requires significant reserve balances to ensure a functioning payments settlement system.

The only way to make such a system operate without extreme interest rate volatility, potentially from tens or hundreds of per cent during cash shortages to zero during days of excess reserves, is to have very frequent open market operations, mostly based on repos, conducted by the central bank to drain reserves when there is downward pressure on interest rates and to feed reserves into the system when there is a shortage of liquidity. This perfectly interest elastic supply of reserves is clearly consistent with Moore's horizontalism (Figure 6.9).

Figure 6.9: Perfectly Interest Inelastic and Shifting Daily Demand for Reserve Balances

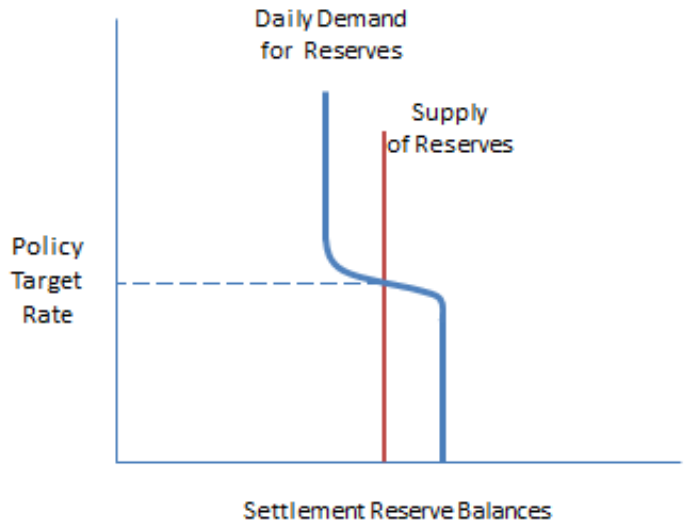


The frequency of open market operations can be reduced without inducing instability if minimum reserve requirements are in place. As Fullwiler's principles indicate, reserve requirements exist mainly for this purpose. In general, the eligible bank liabilities used to calculate minimum required reserves are averaged over a period of days. The resulting minimum level of exchange settlement funds then has to be met only as a mean over a subsequent period of days. This system has been in operation in the past in many countries, and is still widely in use.

Most introductory texts refer to reserve requirements only in the context of the now discredited banking multiplier theory (for example, as in the Australian version of the very widely used Mankiw text – Stonecash et al. 2012). The normal structure of these requirements, where they exist, makes it obvious they have nothing directly to do with limiting bank lending. That mean reserves are calculated over a period subsequent to the setting of their level makes this clear. The only possible effect on lending they may have is to increase the costs of commercial banking, if no interest is paid on required reserves, or if the interest rate paid on them is below the policy rate. In that case, as I have indicated, they act as a tax on the banking system.

Their main purpose is to limit the volatility of the cash rate around the policy target without the requirement of frequent market operations by the central bank. They do this by introducing an interest elastic segment of the demand curve for reserves on every day but the final day of the reserve maintenance period. Banks have the option of holding extra reserves during days when the cash rate is below target, and balancing that out by holding fewer reserves when it is above target. This means that fluctuations in the demand curve for reserves, often caused by mismatches between government spending and government receipts, do not require such finely detailed and frequent market operations by the central bank. They will not lead to interest rate instability if the elastic segment of the demand curve for reserves is long enough (see Figure 6.10).

Figure 6.10: Interest Rate Targets with Reserve Ration Requirements and Averaging Periods



In practice, central banks have almost always maintained some kind of corridor system, whether or not there has been a minimum reserve requirement. The corridor system involves central bank overnight lending to banks which have ended the day with an anticipated negative reserve requirement the following morning, to ensure the integrity of the payments system. This lending can be in the form of a penalty interest rate on overdraft balances, or overnight discount window lending – again, usually at an interest rate above the policy rate.

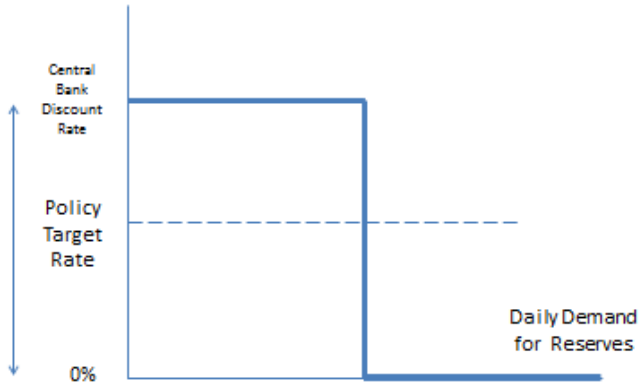
Central banks which have been more influenced by market fundamentalism – for example, the Federal Reserve – have minimised the extent of such lending, through occasional

statements to the effect that overnight loans are a privilege and not a right, and so should not be abused by member banks, and through associated 'frown costs' and the threat of tighter supervision for banks using this facility. European central banks historically were more comfortable with an effective overdraft system for banks, and often deliberately left the banking system short of cash to force commercial banks 'into the Bank' on a regular basis (Bindseil 2004a).

Minsky (1986, p363) recommended regular discount window lending to individual banks, in preference to a reliance on market operations, to maintain a close prudential relationship between the central bank and commercial banks. Bindseil made the point that modern repo operations are effectively secured short term loans, and apart from the fact they are not initiated by individual banks and are less helpful from the perspective of prudential supervision, are not very different from discount window lending.

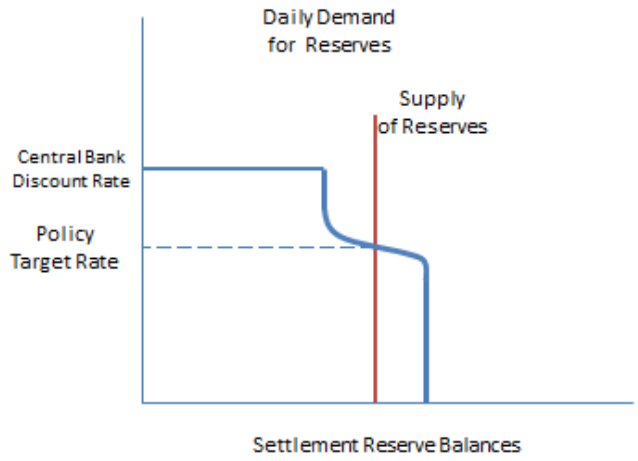
The addition of discount window lending at an interest rate above the policy rate changes the situation to the following (Figure 6.11):

Figure 6.11: An Interest Rate Corridor with a Zero Floor Rate.



Discount window lending plus a minimum reserve requirement leads to the following outcome (Figure 6.12):

Figure 6.12: A Corridor with a Zero Floor and Reserve Averaging

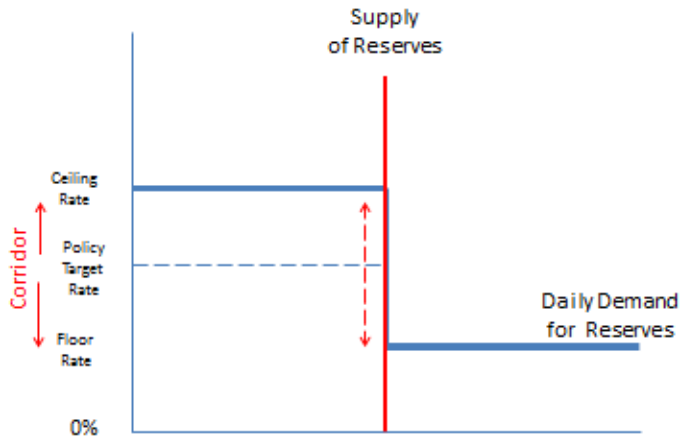


The above system is a tunnel system with a ceiling equal to the discount rate and a floor of zero. A central bank which aims to maintain its policy rate above the floor still has to accommodate fluctuations in the demand for cash reserves. Moreover, to return to the core axiom of modern monetary theory, a central bank is not in a position to accommodate increases in government spending without either the government, or the central bank itself, making net sales of bonds to the non-government sector to mop up the increase in reserves which is always the result of government spending in excess of government receipts. This does not undermine the core axiom, as I have already said, but it does complicate its exposition. It makes it appear as if the bond sales 'finance' the government spending, when this is not the case at all. Bond sales merely drain the reserves created by the government spending, and maintain the cash rate at its target level.

As the financial crisis struck in 2008, the Federal Reserve began to make interest payments on reserve balances, for the first time. This facility had already been legislated for, but it was planned for payments on interest on federal funds to commence in 2011. However, due to the extent of the crisis such payments were introduced in 2008 (Board of Governors of the Federal Reserve System, 2016). Other central banks, like the Reserve Bank of Australia, had made payments on reserves of exchange settlement funds for many years. Beyond limited and pre-agreed deposits and advances to exchange settlement account holders, the RBA pays interest on reserves at 25 basis points below the target cash rate, and charges interest on overnight lending at 25 basis points above the target cash rate.

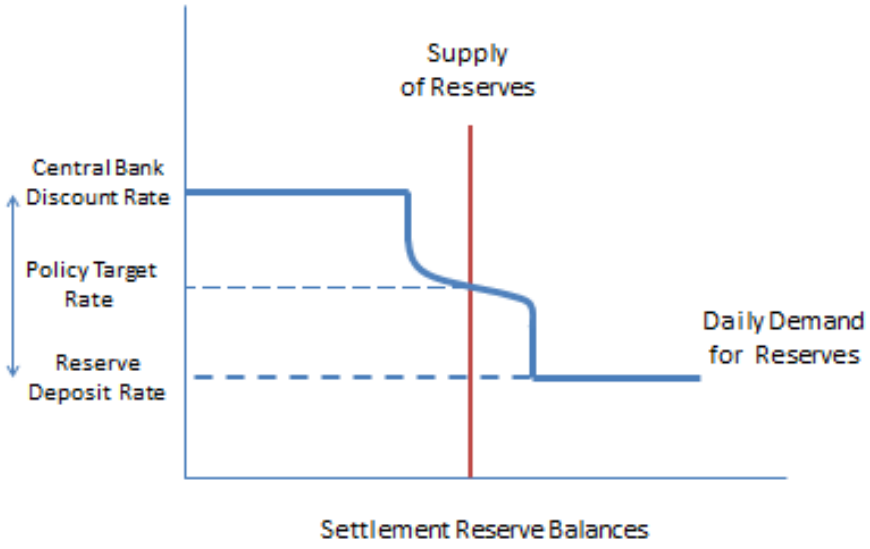
This creates a corridor within which the overnight cash rate on inter-bank lending will lie (Figure 6.13). In Australia, the cash rate must lie within +/- 0.25% of the Reserve Bank's target level. The floor rate is the rate paid on reserves; the ceiling rate is the rate charged on discount window lending. The floor of the corridor is no longer 0%.

Figure 6.13: A Corridor with a Non-Zero Floor Rate



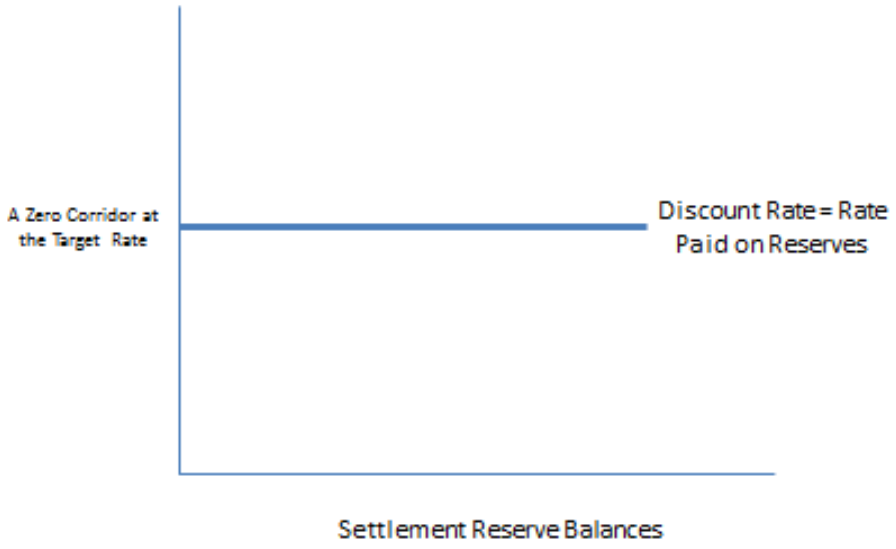
It is possible to combine the corridor system with a minimum reserve requirement. This is the current US system, or would be, were it not for the substantial excess reserves generated by quantitative easing. It can be represented as follows (Figure 6.14):

Figure 6.14: Combining a Corridor with a Non-Zero Floor with Reserve Averaging



It would be a simple matter to reduce the size of the corridor down to zero, so that the central bank pays out the same (policy) rate on deposits as it charges on overnight lending (as in Figure 6.15). This would provide a precise control over the policy rate with zero open market operations, and no need for an overnight inter-bank money market (Bindseil & Jablecki 2011, pp 7-8). This approach has much to recommend it, and could be combined with term deposits at, and loans from, the central bank to determine as much of the term structure of interest rates as was desired, using the central bank's balance sheet for this purpose. As for the arguments that can be made against it, they have no logical basis beyond market fundamentalism and a desire to support overnight inter-bank lending.

Figure 6.15: A Zero Corridor



When the crisis struck, the Federal Reserve and other major central banks used a variety of mechanisms for stabilising the banking system and financial markets. According to Lavoie (2010, p4), the onset of the crisis is was not brought on by the collapse of Lehman Brothers, but over a year before, on 9th August 2007, when European banks stopped lending to each other. This incipient crisis was dealt with by the European Central Bank, by lending almost €100 billion to commercial banks. The Federal Reserve and other central banks also supplied additional liquidity to the clearing system, and in the following month, the Fed began cutting the federal funds rate. Less conventional monetary operations started with the introduction of the term auction facility in December 2007.

The injection of additional liquidity into the banking system, through longer than normal collateralised loans, or subsequent asset purchases, would, if not sterilised, lead to increases in reserve balances and a decrease in the federal funds rate below its target. In 2007-08, such operations were sterilised – initially through repo sales of treasury bills from the Fed's own balance sheet, which involved the substitution of a more liquid for less liquid assets in private balance sheets (and was effectively an 'operation twist' activity), and later through government sales of new treasury bills. These had different implications for size of the Fed's balance sheet, but had identical implications for the consolidated government balance sheet and for the financial system. As already stated, the central bank's balance sheet should always be incorporated into the general government balance sheet, to avoid obscuring the truth.

What was happening was, in effect, nothing different from the normal liquidity management operations of a central bank in the cash market, but on a far greater scale. General government transfers of funds to the private sector – in this case, from the central bank, purchasing, or accepting as collateral, assets which were now highly illiquid – were feeding excess reserves into accounts at the Fed. These funds were being drained again, via sales of government bills by the Fed or the Government itself.

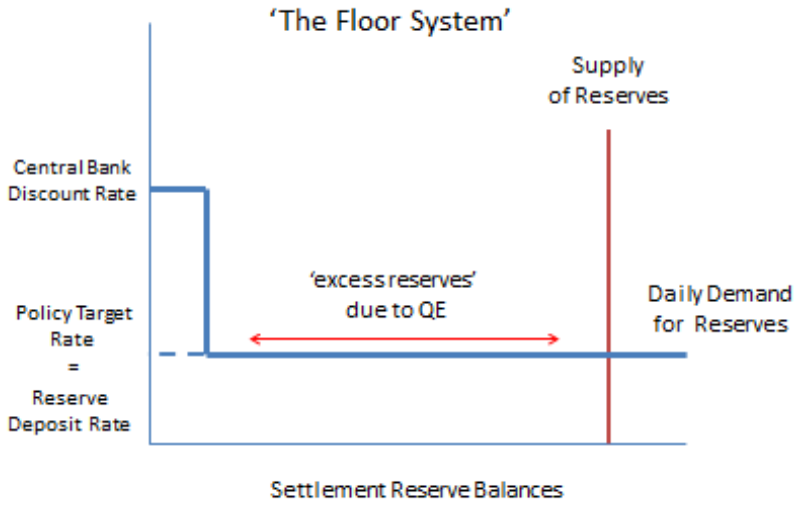
Following the shock of the collapse of Lehman Brothers on September 15, 2008, the depth of the financial crisis became so severe that the Federal Reserve temporarily lost control of its policy rate. Initially, the demand for reserves was underestimated, so that the federal funds rate rose above its target. In subsequent weeks, the Fed reacted with an over-provisioning of reserves so that the rate fell below its target. On October 9th, the Fed moved to a genuine

corridor system, whereby it paid interest on most reserve accounts at a rate below the target rate.

However, on November 8th 2008, given the scale of reserve creation due to the financial crisis, the inability of the Fed to drain the reserves created, and the unwillingness of politicians to drain these reserves, given the debt ceiling, the Fed finally adopted the floor system (Lavoie p11).

Under the floor system, the central bank and government deliberately supplied excess reserves to the banking system, making the detailed day to day management of liquidity on the money market with regular repos unnecessary, and controlled the policy interest rate by setting it equal to the floor rate paid on reserve funds (as in Figure 6.16).

Figure 6.16: The Provision of 'Excess Reserves'



Borio and Disyatat of the BIS (2009), who have written extensively on what they call the unconventional monetary operations of recent years, have referred to a 'decoupling principle' under the floor system. The point they stressed is that a correct understanding of the banking system and endogenous money implies that the supply of reserves and base money must be endogenous under any other system of interest rate management. Whether or not there is an effective discount rate, and whether there is an above-zero floor rate on reserve balances under a conventional corridor system, it is essential for the central bank to supply exactly the required quantity of reserves and base money, and to passively accommodate any change in the demand for reserves, in order to hold the cash rate equal to the policy target.

On moving to a floor system, with excess-provisioning of reserves (as in, the provision of more reserves than those required to facilitate the payments system), reserves and base money become exogenous. For example, if the central bank chooses to pursue, over an extended period of time, large scale purchases of financial assets from the private sector, increasing bank reserves, this has no implications for the policy interest rate. The banking system as a whole cannot rid itself of these reserves, and since reserves are remunerated at the policy rate by the central bank, they will not be lent on the inter-bank market below this rate.

6.10 Fiscal Implications of the Decoupling Principle

Borio and Disyatat explain that this makes it possible to use the policy rate for its normal purpose of anchoring short term interest rates, while the level of reserves can be used for more general credit easing policies.

The crude (mis)understanding of the asset purchases on the Federal Reserve, and other major central banks, as quantitative easing, is not shared by the Bank for International Settlements. This is the idea that an increase in the reserves of the banking system will somehow lead to the banks 'lending out' these excess reserves, and therefore to a credit creation process based on money multiplier reasoning. I have already explained that this multiplier process is a fallacy; that the availability of reserves does not limit the availability of credit, and that instead lending depends on a demand for credit from borrowers with a good credit rating at a

profitable rate of interest. It is clearly the case that banks are not limited in their lending operations by their reserve balances. This is understood by central bankers with operational experience, like Bindseil, and by commercial bankers, although by no means by all academic economists, and particularly not by those still leaning towards crude monetarism.

Unfortunately, Borio and Disyatat, like many neoclassically trained central bankers, draw the wrong conclusions from decoupling. They draw the inference that decoupling provides the central bank with a valuable opportunity to use its balance sheet to influence long term interest rates, through purchases of long dated bonds, to drive their prices up and their yields down. They believe this will have other portfolio effects on financial markets; possible wealth effects on consumption; and could possibly reduce the costs of financing long term investment in the private sector.

This is mistaken, in two senses. Firstly, what these asset purchases generally represent is an asset swap between the consolidated government sector and the private sector, whereby the private sector accepts very low interest bearing reserve balances in return for higher interest bearing government securities. This is a contractionary effect – the opposite of what is intended (Mosler 2012).

Secondly, any positive impact which might result from the bidding up of asset prices, or the purchase of 'troubled assets' at above what would otherwise have been their market value, by the central bank, is really a fiscal operation and not a monetary one. Fiscal operations

supply net financial assets to the non-government sector, and monetary operations do not. The purchase of securities at above market values represents a transfer of financial assets from the government to the non-government sector, and is therefore a fiscal operation. The same expansionary effect on demand could have been achieved more efficiently through conventional government spending, or even tax cuts.

The lesson which ought to be drawn from the decoupling principle is that this small institutional change makes completely clear the validity of the core axiom of modern monetary theory. Central banking practice has been forced to change in the direction of a clearly modern money framework.

> "**There are fiscal implications to this finding. If central banks can control both the rate of interest and the amount of reserves, instead of one or the other as we were long led to believe, it becomes clear that the deficits of federal government can be nearly indifferently financed either by issuing government securities or by forcing banks to hold reserves at a deposit rate that is close to the interest yield on Treasury bills. This certainly requires more thinking."**
>
> (Lavoie 2010, pp 20-21)

Lavoie is right – a finding of this nature requires a complete rethinking of the framework for macroeconomic stabilisation, and of economic policy generally. It provides a complete justification for the core axiom of modern monetary theory, in such clarity that there is little logical room for further debate. The core axiom, in a monetary sovereign, is valid and has

been shown to be valid. It is clearly true that the government does not need to tax to 'finance' its spending, and that taxation is for the other purposes discussed above. It is also now very clearly true that the government does not need to sell bonds to finances any government deficit. Indeed, under decoupling, it does not need bond sales for the purposes of interest rate maintenance. The possibility of abolishing the market for government bonds is now something worthy of discussion, based on a careful consideration of the remaining purposes – if any – of this market.

The mystery is that all the above is not universally understood. Given a proper understanding, there would now be a well-informed discussion of the implications for policy objectives, instruments, and institutions. It would be beyond debate that an arbitrary target for the government financial balance, however defined, over a particular period of time, is mistaken, and a barrier to the management of the economy to promote the public good - more specifically, to avoid any involuntary unemployment. I will defer my suggestions for policy and institutional reform until my conclusion, as they will benefit from a prior analysis of stock flow consistent models, and consideration of a job guarantee.

For one leading orthodox economist who did understand the potential policy space enjoyed by monetary sovereign governments, the lack of a broader understanding played what he saw as a useful role:

> "**I think there is an element of truth in the view that the superstition that the budget must be balanced at all times. Once it is debunked (that) takes away one of the bulwarks that every society must have against expenditure out of control. There must be discipline in the allocation of resources or you will have anarchistic chaos and inefficiency. And one of the functions of old fashioned religion was to scare people by sometimes what might be regarded as myths into behaving in a way that the long-run civilised life."**
>
> (Paul Samuelson, interview with Mark Blaug, quoted in Wray 2012, p200)

So for Samuelson, the myth that a sovereign government faces a financial budget constraint is an 'old fashioned religion', which is deemed to be useful on the basis that governments which properly understood this as a fallacy would, inevitably, fail to live within the real resource constraint.

I must disagree with Samuelson. In any event, government fiscal plans are subject to parliamentary scrutiny in a democracy, and politicians who net spend beyond real and/or ecological constraints should be disciplined by the democratic process.

We ought not to depend on a superstition and an appeal to 'old fashioned religion' as a basis for responsible economic management. The alternative to 'chaos and inefficiency' should not be a set of 'myths'.

We can surely do better than that.

Appendix to Chapter Six

Framing 'Hard' Monetary Theory

"His argument is impeccable. But heaven help anyone who tries to put it across."

(Keynes, on Lerner's 'functional finance', in a letter to James Meade, written on April 25th 1943, quoted in Colander 1984, p 1574)

It is not enough for modern monetary theory to be a valid description of monetary sovereign financial systems.At least some of the problem relates to the psychology, and even the neuro-science, of how we think and how our reference-dependent brain forms and retains ideas and makes judgements. We, usually unconsciously, think naturally in terms of metaphors, and connecting and supporting networks of metaphors supporting 'memes' about our environment and the economy. This is closely linked to the dominance of Stanovich and West's system one thinking, in forming impressions about the world. It is also consistent with the views of leading neuro-economists. It makes the framing of economic issues, and, in particular, the way in which economic discussions are continuously and consistently framed by conservatives and neoclassical economists, so powerful and so difficult to shift.

Two recent papers relating to these issues are Wray (2012a) and Connors & Mitchell (2013). They both draw on the work of the cognitive scientist, George Lakoff, who has said,

> **"Framing is not primarily about politics or political messaging or communication. It is far more fundamental than that: frames are the mental structures that allow human beings to understand reality – and sometimes to create what we take to be reality. But frames do have an enormous bearing on politics … they structure our ideas and concepts, they shape the way we reason … For the most part, our use of frames is unconscious and automatic."**
>
> (Lakoff 2006, quoted in Williams 2014)

Lakoff's views should have been understood by Post Keynesians and other heterodox economists long ago. Put simply, it isn't enough to be right. There is no inevitable rejection of falsifiable theories, as in Popper's theory of the scientific method, or triumph of progressive over degenerative research programmes, as in that of Lakatos. The continuing dominance of orthodox neoclassical economics in the academies and in most policy making institutions is about framing; about the effective use of metaphors to appeal to the 'embodied mind' and comfortable, system one thinking; and the clarity and relative consistency of neoclassical ideas in that context.

Modern money theory outperforms orthodox neoclassical macroeconomics in both descriptive and predictive terms – it has won the Lakatosian scientific test. More broadly the same could have been said of Post-Keynesian economics ever since Keynes and Kalecki. However, Post-Keynesian economics has failed the metaphorical test and the test of mimetic

competition. Both Wray, and Connors and Mitchell, explain how the apparently counter-intuitive descriptions and predictions of modern money do not fit well with the comfortable but misleading neoclassical metaphor such as 'government as household'. Furthermore, the degree of diversity in heterodox economics generally does not lend itself to the construction of an effective 'meme' with an alternative, consistent and supporting set of metaphors.

Wray quotes Lakoff, discussing the use of framing by conservatives:

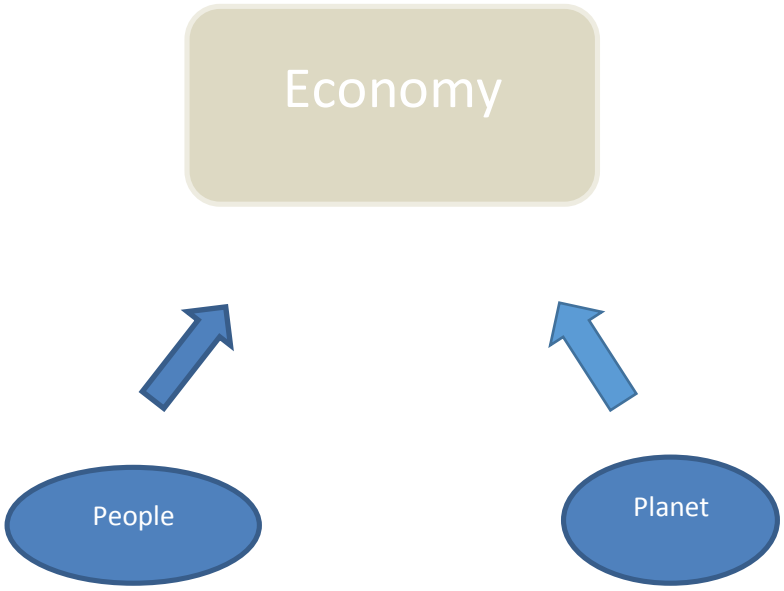
> **"They understand the importance of morally-based framing, the importance of not using the opposition's language, and the importance of an extensive communication system that operates daily everywhere…Everything you understand is a matter of framing. And what counts as a fact depends on the frame used in understanding."**
>
> (Lakoff, quoted in Wray 2012a, p4)

Connors and Mitchell also stress the deliberate use of framing by the conservative side of politics, to transform a financial crisis caused by private debt and financial fragility fed by a long period of financial deregulation into a mythical problem of excessive regulation and too much government.

> **"The resurgence of the free-market paradigm has been accompanied by a well-crafted public campaign where framing and metaphor triumph over operational reality or theoretical superiority."**
>
> (Connors & Mitchell 2013, pp 6-7)

They present two models of the economy, drawn from Shenkar-Osorio. In the first of these models – the individualist model – the Economy is seen as a natural entity, and almost as a primitive god, which must be served by both the people and the planet (Figure 6.17). Both human and ecological resources are there to serve the Economy. The Economy is a self-regulating organism. Interference with the natural workings of the Economy by the state distorts the natural equilibrium and makes the economy sick. The Economy delivers to everyone what they deserve. This is not a model of market failure, but of an efficient 'free' market system, with nothing positive for a government to do, and no purpose to government spending or taxation. The objective of all should be to feed the Economy, so that Real GDP can grow as rapidly as possible. The dominance of economic growth as an objective is taken for granted and unquestionable. The myth of barter is consistent with this model, as is the related myth of 'sound' finance. It is impossible to engage with the ideas of modern monetary theory in the context of this model.

Figure 6.17: The conservative economic construction



Sources: Shanker-Osorio (2012); Connors & Mitchell (2013)

This individualist model of Shenkar-Osorio is, in a sense, just a less sophisticated version of the neoclassical general equilibrium model. It supports the thinking of those economists who have contributed to, or the many more who use, general equilibrium models. It is at the centre of the conservative, neoclassical meme. It is a profoundly important error for those New Keynesian economists on the progressive side of politics to engage with this meme, to implicitly accept the model, or to use general equilibrium to frame economic issues.

For example, within this model, fiscal deficits are inevitably seen as drawing resources from the natural entity called the Economy. It is natural to imagine that these deficits must be

repaid. It is natural to imagine that the government is sapping the strength of the economy when it runs persistent deficits. A strong economy would be an economy with a small government which did not run deficits, and perhaps did not do very much at all.

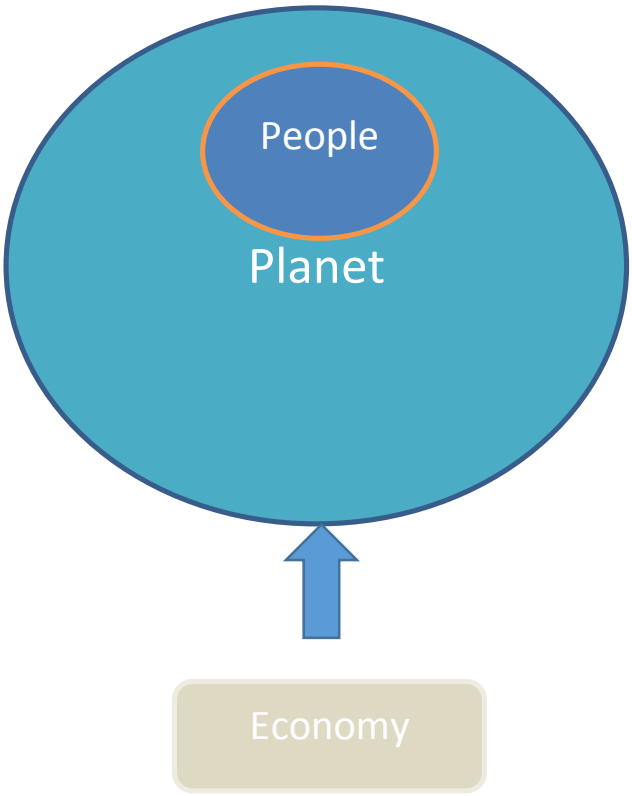
This is all, as should be clear by now, mythical.

No one with a clear understanding of the monetary and financial system; of modern monetary theory; of the stock flow consistent macroeconomics, which I will discuss in the following chapter; or of Keynesian and Kaleckian macroeconomics, could possibly share in this myth.

Yet, the myth was powerful enough to undermine the first Keynesian revolution. It has sustained general equilibrium reasoning throughout the modern history of economic thought, and, as Connors and Mitchell point out, has facilitated mass self-deception in the profession, the political class, and society more generally, since the financial crisis.

The alternative model presented by Shankar-Osorio is one where the People and the Planet are at the centre, and are the natural entities (Figure 6.18). In this model, the economy is a constructed object. This model is collectivist, rather than individualist.

Figure 6.18: The economy is ‘Us’



Source: Shanker-Osorio (2012), Connors and Mitchell (2013)

The economy is here to serve the People, and to sustain the ecological resources of the Planet. Growth in Real GDP is not an overwhelming objective, and in fact not a desirable one, if it conflicts with the ecological well-being of the Planet, and, consequently, the well-being of the People who must depend on the Planet. Social well-being, including the need for secure and worthwhile employment, and the avoidance of excessive inequality in the distribution of income and wealth, are suggested by this model. This model is at the centre of a progressive meme, consistent with a realistic model of the economy, with realistic institutions, and a currency issuing and enabling government with the power to influence outcomes for good or

ill. There is nothing natural about the economy in this model – no natural rate of unemployment, no natural rate of interest, and certainly no general equilibrium. This model is consistent with the stock-flow consistent macroeconomics of Godley and Lavoie, the modern money theory of Wray and Mitchell and Lerner's functional finance, Minsky's employment guarantee, and the concerns of ecological economists.

This is, broadly, the framework against which progressive and realistic economics should be constructed and applied. It is the starting point which should be communicated to policy makers and the wider public by those wishing to build a successful post-neoclassical economics, which must, in time, substantially reject and replace what has until now been the dominant neoclassical paradigm. Only when further progress has been made in this direction will politicians feel safe to engage with modern money theorists and other progressives, and only then will the broader public be more receptive to their arguments.

Being right isn't nearly enough:

> **"We see the progressive challenge in two parts: (a) the need to better educate the public regarding macroeconomic matters in ways that our learning skills can absorb; (b) develop language that appeals to our intrinsic frames, which foster concern and action (such as economic justice/rights) and connect people with the economy rather than reinforce the idea that the economy is a natural construct that we should fear."**
>
> (Connors & Mitchell 2013, p 16)

Connors and Mitchell go on to list a series of examples of effective and intentionally misleading neoclassical metaphors, relating to: (1) government spending ('spending like a drunken sailor'); (2) the fiscal balance ('budget black hole'); (3) government debt ('mortgaging the future'); and (4) income support (where 'working families' are the paragon for comparison). They stress the importance of language, and of the deliberate and purposeful use of metaphors by progressive economists. They discuss the need to establish the sort of outcomes we desire collectively from our economy, and the subsequent need to frame policy discussions with care so that we emphasize our ability to change the economy to deliver those outcomes. The use of language which effectively communicates economic realities, and the need to avoid misleading conservative frames, are essential.

Connors and Mitchell emphasize the need to frame policy proposals in terms of their impact on people and the planet, rather than on an entity called 'the economy'. This emphasis on the purposes of policy proposals must be supported by the use of appropriate language. They question the use of the term 'spending' in the context of a sovereign government, since to 'spend' implies to use up. They prefer the more positive term 'government investment' to achieve public purposes.

There are good reasons for considering the need to go beyond this, and avoid using terms like government (or public, or, even more so, national) debt; and government (or budget) deficit, for a monetary sovereign. The word 'debt' implies something which needs to be paid back,

and evokes possible bankruptcy. Monetary sovereigns never need to pay back their debts in their own currency. Nor do they need to issue debt, and they cannot go bankrupt. The appropriate metaphor for sovereign government 'debt' is 'money'. The term 'deficit' implies a shortfall or a lack of resources. Governments will normally be in 'deficit'; are not financially constrained; and a deficit in no sense involves a shortage of anything, and as we know a monetary sovereign cannot run out of money. Again, the term is misleading. A government deficit could be termed a non-government financial surplus, or alternatively a government net injection. There is every reason to abolish the concept of sovereign government debt, and to replace it with a form of 'broad, outside' money.

Talk of 'balancing the budget' is also misleading, since it implies a state which can be actively achieved without adversely affecting the operations on the economy and the public purpose. It also obscures the considerable endogeneity of the government financial balance. References to government 'saving', or a definition of national saving that includes a fiscal surplus as an element in national saving, are misleading. To save is to set aside current resources, in order to maintain or facilitate higher levels of future consumption. A fiscal surplus does neither the first nor second of these things, and in fact decreases (dollar for dollar, as Mosler puts it) the ability of the non-government sector to net save.

Other terms with a hidden bias towards neoclassical mythology include 'fiscal consolidation', 'adjustment', 'reform' (in the context used by neoclassical economists), 'rationalisation', 'incentives' (again, in a neoclassical context), 'doing more with less', and even 'taxpayers' money'. Just using these terms, in the context they are generally employed in economic

debates, buys into the neoclassical paradigm as a broad meme. If such language is to be used at all by progressives who understand modern money, it should be with care, and with the utmost attention to the framing of economic debate.

There is a tension, however, between the introduction and use of more positive and less misleading terminology; as part of a movement to construct a better meme for economic policy, to help bring about the necessary paradigm shift in economics; and the need to communicate not only with neoclassical economists, but also with fellow heterodox economists, politicians and the public; most of whom are as accustomed to biased economic language as they are to the 'qwerty' keyboard.

Even Marc Lavoie, who is, as I have said, broadly sympathetic to modern monetary theorists, has expressed concern regarding modern monetary theorists using language in a different way to other economists (Lavoie 2011). For example, in modern monetary theory the term net saving (or even sometimes, just 'saving') is often used to refer to a net financial surplus on the part of the private sector. The same term is used in a different context by other economists. In my view, the modern money use of the term is the more valuable one. Less justifiably, he has also complained about modern monetary theorists using the terms 'vertical' and 'horizontal money' to refer to government (or outside) money and credit (or inside) money respectively. This is because *horizontalism* and *verticalism*, as we have seen, are terms used in the debate between endogenous and exogenous money theorists. I am sure the same remarks would be made with reference to Connors and Mitchell's use of the term 'government investment', or of my suggestions above.

Nevertheless, our use of language is important, and whether the benefits of continuing to use economic terminology drawn from the neoclassical school outweigh the serious problems this causes, is worth debating. Just as institutions can be changed, so can terminology. If both our economic institutions and our terminology can be changed to make the validity of modern monetary theory much clearer, we should change them. Whatever else we do, 'progressives should avoid debating within the frames that the conservatives use' (Connors & Mitchell).

There is a strong argument, based on years of failure for progressive economics to gain political influence, or to build on or even just to maintain its position on the academic fringe, that the time for modern monetary theorists to compromise on these issues is in the last. The imperative now is to build a 'meme' for modern money (Wray, 2012), using effective and supporting metaphors, and language which does not mislead. This means taking into account what cognitive linguists, psychologists and neuro-scientists have discovered about how we form opinions and make decisions.

In a number of ways, modern monetary theory continues to make progress:

- Through a continuously expanding set of scholarly publications

- Through a persistent consistency with the evidence

- Through an expansion of interest outside the economics profession and the policy establishment, and from at least some other economists and policy makers.

- Through demonstrating the continuing, and inevitable, failure of general equilibrium models to incorporate a realistic monetary and financial system and therefore provide useful policy guidance

It is incumbent on those who have understood the internal logic and the implications of this logic for public policy to add their voices to those who are not only calling for an intellectual revolution within economics, but also insisting that something very like the modern monetary theory of Wray, Mitchell, Fullwiler, Kelton and others, must be central to this revolution. The first Keynesian revolution failed to replace soft 'as if' economics with hard 'because' economics. We now have the elements for a more developed and consistent second Keynesian economics, which is better equipped to succeed in the replacement of the real analysis of neoclassical macroeconomics with a realistic monetary analysis, as advocated with only partial success by Keynes.

Chapter Seven

Stock-Flow Consistent Macroeconomics

"A realistic model must start with a comprehensive system of national accounts, flows of funds and balance sheets, which are coherently related".

(Godley & Lavoie 2007, p 500)

7.1 The Importance of Correctly Accounting for Flows and Stocks

Economists have always been attracted to an equilibrium form of analysis with no role for a realistic financial system, and where accounting identities are hardly discussed. It is impossible to spend a career teaching economics in an academic institution without encountering an occasionally contemptuous lack of interest for the discipline of accounting, and even for the importance of key accounting identities. The truth that the realities of accounting identities, when they imply movements in private sector stock-flow ratios away from sustainable norms, can trump the results of mathematical behavioural models and econometric analysis, is not widely understood.

This is demonstrated in a paper entitled, *'No One Saw This Coming': Understanding Financial Crisis Through Accounting Models'* (Bezemer 2009), which provides evidence that stock-flow

consistent, or correct accounting, macroeconomic models provided clear warnings about growing financial fragilities, prior to 2008, while general equilibrium models did not, and indeed could not.

The mass of the profession ignored these concerns, relying on forecasting models where Minskian fragility and potential mass default were virtually ruled out by definition, as being inconsistent with transversality conditions. However, a variety of heterodox economists, including Godley (as early as 1999), provided both clear warnings and models explaining the basis of their concerns. That such warnings were justified is now widely accepted, including by some central bankers (Barwell & Burrows 2011), even if it has not yet led to significant shifts in policy making.

Godley, and his modern monetary theorist colleagues, based their warnings on stock-flow consistent models, where the implications of financial flows for stocks of net assets and liabilities were correctly described. This correct accounting, inspired by Minsky and others, made clear the fact that developments in inter-sectoral financial flows from the 1990s onwards, particularly in the USA, had implications for sectoral balance sheets which were implausible. Tension points were building up in the financial system, and a serious crisis was an almost inevitable result. It was just a question of timing (Godley 1999).

Given the handicap of general equilibrium analysis for orthodox neoclassical economists, it is not surprising that those economists who have endeavoured to account for the implications of short run financial flows for the evolution of stocks and relevant stock-flow ratios, have nearly always been those operating outside the neoclassical orthodoxy. This includes those in

the Austrian School, whose analysis and policy prescriptions are not under discussion here, and those Post-Keynesians who have placed the monetary and financial system at the centre of their analysis, and who can be seen as the antecedents of present-day modern monetary theorists.

Both Keynes and Kalecki laid emphasis on the relationship of stocks to flows. In the case of Keynes, this was mainly in the later parts of the *General Theory*, and especially chapters 12 and 17, which are commonly ignored by neoclassical synthesis New Keynesians, and papers written after the General Theory. In the case of Kalecki, his models of the business cycle incorporate a more sophisticated analysis of private investment than Keynes' marginal efficiency of capital theory, where the implications of the flow of new investment for the stock of capital help to drive cycles.

Kaldor, Davidson, Minsky and Godley are amongst those Post Keynesians of the first and second generations to take relationships between financial stocks and flows seriously. In the case of Minsky, stock-flow analysis is a centrepiece of his shifting balance sheet model of the economy, and his financial instability hypothesis. However, it was Godley, first as the leading figure in the New Cambridge School of the 1970s, but later, and much more clearly, in collaboration with Lavoie, who made the most significant advances in the stock flow consistent modelling of a macro-economy.

The importance of Godley and Lavoie's work is only now very gradually dawning on some parts of the economics profession. It is widely respected and applied by modern monetary theorists, and accepted as significant by other Post Keynesians. It is also seen as a useful tool

by some investment bankers and fund managers. The discussion of stock flow consistent models is just beginning in major central banks. The influence of such models should grow in the future, as they increasingly challenge dynamic stochastic general equilibrium models as tools for modelling economies and analysing the potential consequences of policy regimes, of the evolution of economic variables over time, and of genuine economic shocks.

There are references to logical stock-flow consistency in orthodox neoclassical models. For example, the transversality condition in DSGE models is in a sense stock-flow consistent. It assumes that the present value of an often infinitely lived representative household's consumption equals the present value of that household's lifetime wealth. In other words, as indicated above, it virtually assumes away the possibility of insolvency. It is the failure to tackle money, finance and financial fragility, in any meaningful sense, that ought to have undermined the faith of economists in orthodox neoclassical models since the financial crisis. Instead, it has often led to a retreat to IS-LM model, as with Krugman, which is not much of an improvement, not properly stock-flow consistent, and not in its original form consistent with endogenous money. Neither DSGE models nor the old IS-LM model are of any use in analysing the potential for financial fragility, or picturing the economy as it is, which is a series of shifting and inter-locking balance sheets.

The other reference to a form of misapplied stock-flow consistency in neoclassical economics is in the analysis of the 'government budget constraint', as discussed in the previous chapter. This time, the notion is that the current net debt of a government must equal the expected present value of future net budget surpluses. This underlies, in its most naïve form, logical arguments for Barro-Ricardian equivalence, and in a less naïve form, the equally mistaken

fiscal theories of the price level of Woodford and Bernanke. It is unfortunate that these theories lead to the notion that fiscal deficits must crowd out private sector spending, either through cuts in private sector spending as private sector agents 'rationally' anticipate higher future taxes to offset a growing government debt, or through inflation, since the price level has to rise to reduce the real value of government debt in line with the present value of future surpluses.

These are just logical games in a misleading theoretical model which neither needs nor allows for realistic money and finance. In a realistic model, there is no more a simple relationship between the fiscal balance and the price level, than there is between any measure of the money supply and the price level. Inflation in any realistic model must be a conflicting claims phenomenon, where interest group claims – particularly, target real wages, but also business mark-ups, and claims by the owners of essential resources - are potentially affected by significant shifts in capacity utilisation, and therefore indirectly by aggregate demand. In this context, the major contributory factor to the inflation of the mid-1970s was a new claim from oil exporters, adding to the existing pressure for higher real wages fed by many years of close to full employment and previous productivity gains. This was a Post-Keynesian inflation, as understood by Davidson and Minsky, and informed by Kalecki's analysis of distribution. It was not a simple consequence of deteriorating fiscal positions and/or increases in the rate of growth of measures of the money supply (where money could be seen as an asset with no corresponding liability).

In a realistic model of the economy, with shifting sectoral balance sheets; Keynesian uncertainty; a form of modified Kaleckian mark-up pricing; firms targeting profits; workers

targeting real wages; a circuit view of money; financial institutions and markets playing a critical role in the financing of inventories and capital investment; and a realistic monetary sovereign government with its own central bank, there are very different logical consequences (as we shall see). The impact on the economy of changes in policy interest rates has a very different long term impact on demand, output, and employment. The fiscal position is partly endogenous, depending on the behaviour of the private sector. There is often (normally) a conflict between policies to achieve and maintain something close to full employment, and a target for the fiscal balance. Government liabilities, including government (outside) money, are part of the financial wealth of the private sector.

Godley and Lavoie (2007) demonstrate these results, and many others, in a series of models of increasing sophistication, of closed and open economies, starting from a highly simplified model and gradually building in complexity until their models have over 100 equations. For the purposes of macro-economic analysis, they are superior tools to the DSGE models still widely applied around the world. DSGE Models, based on core neoclassical axioms and soft economics, provide a dangerously misleading precision by encouraging the discussion of 'optimal' policies in an ergodic environment. Godley and Lavoie's models are designed to demonstrate what cannot feasibly happen, as much as what might eventuate. By excluding the implausible, based on correct accounting, it is possible to construct effective policies to limit instability and maintain approximate full employment within a non-ergodic (uncertain) environment.

The importance of this advance can hardly be over-stated. Prior to stock-flow consistent modelling, non-orthodox economists had nothing beyond partial equilibrium analysis to put

up against general equilibrium models, to identify and explain how the various sectors of the economy might interact. Keynes, himself, advocated a Marshallian partial equilibrium approach, and many Post Keynesians (including Rogers 1989) have stressed the advantages of partial equilibrium analysis when it encourages you to think through cause and effect, and to take historical time into account in economic analysis (which Walrasian general equilibrium models fail to do, since they truncate time, as if everything happens at once).

However, others, including Harcourt, quoted in Godley and Lavoie, have suggested that the lack of anything to put up against general equilibrium has played a part in the failure of Post Keynesian economics to become the dominant paradigm, or at least to have more influence on policy discussion. A notable exception is Sraffian analysis, but Sraffa's Neo-Ricardian economics has nothing directly to contribute towards the study of unemployment, or to monetary economics.

The great majority of the economics profession remains firmly neoclassical in orientation, even in 2016. Somehow, many of these neoclassical economists, and those they advise, and who support them, have turned the Global Financial Crisis from a crisis caused by financial deregulation and growing private sector, and especially household, indebtedness, into a crisis supposedly related to government deficits, and a lack of deregulation. They have also, in many cases, misunderstood the importance of monetary sovereignty, and the causes of the subsequent euro-zone crisis. They have misread the euro-crisis as a lesson in avoiding government indebtedness, when the data conclusively shows it is a lesson in avoiding the sacrifice of your monetary sovereignty to a supranational institution, as Godley explained before the introduction of the euro (Godley 1992).

There is an unwillingness to reconsider their core model, and a widespread desire to sweep the financial crisis 'under the carpet' and go back to business as normal.

The consequent prospect of further financial instability in the future, together with an ongoing reluctance by policy makers and banking regulators to take Minsky's analysis on board, and a continuing determination to target fiscal surpluses in many countries (including Australia), make it essential to develop a broader understanding of stock-flow consistent models, alongside the modern monetary theory which fits so well into this framework. Along with the pursuit of ecological sustainability, this is the most important task facing progressive economists today. Indeed, in the next chapter, I will touch on the mechanisms whereby full employment and ecological sustainability may be achieved, and it will turn out that a proper understanding of stock flow consistency and of modern monetary theory is essential.

There will be room in this chapter to outline the essentials, and the potential versatility, of stock-flow consistent (SFC) models in general. I will then outline in detail one of the simpler models in Godley and Lavoie; apply it to simulate a standard present day policy mix (in a country similar to Australia); and briefly explain the similarities and differences between the outcome in this simple model and that in Godley and Lavoie's most sophisticated growth model. I will then in an appendix to the chapter develop a compact and therefore still highly simplified model of a growing economy, inspired by Lavoie and Godley (2001), and carry out a similar simulation in this model.

SFC models incorporate three main elements – inter-connected sectoral balance sheets; transactions matrices, which identify inter-sectoral financial flows and imply changes in sectoral balance sheets over time; and a set of consistent behavioural equations and identities driving the transactions matrix and indirect changes in balance sheet variables over time.

Consistency and correct accounting are essential elements in the models. Every financial asset is also a financial liability. For the purposes of consistency, this requires that corporate equity securities are treated as liabilities of issuing corporations. For every economic decision unit holding net financial assets, there must be another with net financial liabilities. With assets here recorded as positive entries, and liabilities as negative, they must sum to zero. In a closed economy, social wealth exists in the form of real assets. In the global economy, wealth exists in the form of real assets.

7.2 Godley and Lavoie's Stock-Flow Consistent, Post-Keynesian Models

The Godley and Lavoie models describe economies as systems of shifting and inter-locking balance sheets, evolving non-ergodically through time. Causes precede effects; production takes place under realistic conditions of constant or increasing returns; transactions require financing and have financial implications; and businesses, households, banks and governments all have decisions to make, and all have to react to changes in the economic environment.

These decisions are not optimising decisions, since optimisation in a non-ergodic environment is impossible. Instead, decision making is based on targets reflecting norms and expectations, where these norms can shift over time as the economy evolves. Decision making is consistent with the informational, cognitive and logical constraints experienced by real decision makers. There is no room here for a maximising 'representative agent' household, and indeed the analysis takes place at the sectoral level.

Business decisions are modelled separately from household ones. Businesses are neither a veil behind which households are the real decision makers, nor are they the makers of what Shackle called 'empty' decisions, based on mechanistic expected profit maximisation. Outside of financial markets, there are no prices set by equilibrium processes – prices are administered, using the standard Post Keynesian normal cost mark-up pricing approach, which is related to the full cost and Kaleckian mark-up traditions in Post Keynesian price theory.

Businesses make decisions each period concerning production and planned inventory investment, and on employment, based on anticipated sales; on costing; on pricing; on capital investment, based mainly on capacity utilisation; and on investment finance. Investment finance is drawn from retained earnings, net equity issuance, and the residual is drawn from net borrowing from banks. The role played by banks in financing businesses (and in the more sophisticated models, households) can be used to explain the monetary circuit approach to the role of endogenous money and credit in the economy. At the very least, it illustrates the significance of the financial system to the real economy, and the irrelevance of economic

models which, while intended for policy purposes, do not incorporate a realistic description of the financial system.

It is businesses and not households which are at the centre of these models, just as they are at the centre of the model in Chapter 3 of *The General Theory*. Businesses make employment decisions, based on expected sales. Unemployment and underemployment is, by implication, involuntary, and attributable to a lack of effective demand. As in *The General Theory*, there is no mechanism whereby flexible wages and prices can deliver full employment when there is insufficient aggregate demand.

The core model is fundamentally a Keynes-Kalecki multiplier model, and perhaps more Kaleckian than Keynesian. The constant or increasing returns, imperfect competition and normal cost plus pricing are all more consistent with Kalecki (1971) than Keynes. Pricing decisions incorporate a mark-up over normal unit costs, which must be sufficient to generate entrepreneurial profits high enough to meet the obligations set up by past financing decisions, as well as generate retained earnings sufficient to fund future desired investment in a way consistent with the norm for business capital structure.

This is the dominant approach to pricing taken in sophisticated Post-Keynesian models, and is broadly consistent with Sraffa's Neo-Ricardian alternative to neoclassical pricing and distribution theory. It is also consistent with Kalecki's degree of monopoly approach to determining a mark-up over direct costs in his models. It can also be interpreted as pricing for a target rate of return.

Households make consumption and savings decisions based on anticipated disposable incomes and lagged wealth – in other words, there is a Modigliani form of consumption function. They then allocate their savings between various financial assets, including deposits, bills, bonds and equities, according to the principles of Keynesian liquidity preference, and broadly in line with Tobin's approach to the consistent modelling of portfolio choice (Brainard & Tobin 1968).

As in Keynes, saving and portfolio decisions are a two- step process. As Davidson (1978) explains, households generally do not directly own productive assets, but instead own 'placements' or financial assets. These financial assets include bank deposits ('inside money') and equities, which are not net assets for the private sector as a whole, and cash (alongside bank reserves, a form of 'outside money') plus government securities, which are net financial wealth for the private sector. The role of government securities and government (outside) money as private sector financial wealth is of crucial importance in stock-flow consistent models, and of course is fundamental to modern monetary theory.

In more sophisticated models, households also borrow from banks, and can be modelled as engaging in speculative purchases of both financial and real assets. This allows unsustainable speculative bubbles to be modelled in this framework, and a broadly realistic financial system is a natural fit within the models. It is appropriate that stock-flow consistent macroeconomics was pioneered at the Levy Economics Institute in New York, given that the institution was founded by Hyman Minsky.

Banks react passively to a demand for loan finance. They set loan interest rates based on a mark-up over deposit rates, given a target for retained earnings, which itself is driven by the need to maintain an adequate capital adequacy ratio (a requirement similar to the first version of the Basel regulations fits easily into the model), and to allow for expected non-performing loans.

The government makes decisions relating to pure government expenditures (government purchases) and the tax rate, which play a key role in driving effective demand, and which are critical to the achievement and maintenance of full employment. Fiscal policy drives the demand side of these demand determined but supply constrained models. Indeed, in the long run, there is no alternative but to rely on fiscal policy for this purpose, since what has become the monetary policy convention of setting short term interest rates to drive demand is easily shown to be ineffective in the long run (both in simple and more sophisticated stock-flow consistent models), due to their rigorous accounting for the impact of financing decisions on balance sheets, and with reference to our recent historical and on-going macroeconomic experience.

The central bank deals in government bills as required to hold the rate of interest on bills at its desired level. The official interest rate in the Godley and Lavoie models is the short term bill rate, and the central bank uses its balance sheet for the purposes of interest rate maintenance. The models make clear that a monetary sovereign government is always able to purchase what is for sale in its currency and, like its central bank, can never become insolvent. Central bank and central government net financial worth are not constraints on fiscal policy. The issuance of government securities is about meeting the private sector

demand for them and managing interest rates. Another lesson from the Godley and Lavoie models, which although crude in places, benefit from the logical correctness of rigorous accounting, is that the central bank could, if it was prepared to use its balance sheet for the purpose, control the whole term structure of interest rates. These models correctly described this very limited potential transmission mechanism for quantitative easing, before QE had even been tried by the Federal Reserve.

The description above is closest to what Godley and Lavoie call 'A Growth Model Prototype', which it is not possible to reproduce in full here. Although it is a closed economy model, it nonetheless has over 100 equations, which fit together to describe a complete logical economy with correct accounting, and inter-connected sectoral balance sheets. This model alone forms a coherent and powerful challenge to orthodox neoclassical general equilibrium models, which do not share its grounding in institutional realism and stylised empirical facts.

Godley and Lavoie also provide open economy models, where a variety of fixed and floating exchange rate closures can be made. These models can, for example, describe the weaknesses of the euro-zone as currently still constituted (as Godley did, long ago). Fully developed open economy models involve the complete modelling of two, or for some purposes three, separate economies. One of their most insightful models includes a monetary union between two economies, and a third economy with a floating currency (Godley & Lavoie 2007).

Such models, and models which are very similar to them, have in recent years been, and are being, developed increasingly widely. I will move on to discuss some of the insights these

models can provide and the reasons why they form the future of macro-economic modelling, below. However, such extensive, if not necessarily complex, models, do not lend themselves to analytical solutions or graphical expositions, which are essential if this approach to modelling is to be widely taught and understood. Moreover, they would form the basis of a complete dissertation, which is not my objective here. Consequently, I will present in this chapter one of Godley and Lavoie's simplest models, which is suitable for teaching purposes.

My aim here is to argue that stock-flow consistency, as in Godley and Lavoie, should be the basis for all future macro-economic modelling to prevent it being misleading and dangerous. I will also argue that this approach naturally complements the monetary circuit view of money and modern monetary theory; that it also supports Minsky's analysis of financial fragility, and a generally Post Keynesian view of the economy; and that it can be linked to Davidson's view of Keynesian uncertainty, Minsky's employment guarantee, and indirectly with some of the insights I have described from behavioural economics.

We have the makings of a general theory, and it is in that context that the significance of Godley's contribution, in later years in combination with Lavoie, can be understood. I have been very critical of the soft economics, axiomatic-deductive approach which characterises much of neoclassical economics, due to its obvious and profound lack of realistic core assumptions. This has been the case both at the level of general equilibrium models, and at the level of expected utility theory as a basis for understanding individual decision making and defining what it means to be rational.

The neoclassical justification for their methodology is based on Friedman's interpretation of Popper's theory of the scientific method. They argue that the unrealism of assumptions is irrelevant, given the consistency of model predictions with real world data. Unfortunately, in practice, the core general equilibrium model (and expected utility theory), fail this criterion too. The normal response to this has been either to defend the core model with ex-post ad-hoc additions and amendments to 'explain' anomalies which have already occurred (but rarely to predict them in advance), or to use some combination of ignoring the data and questioning its validity. The truth regarding neoclassical economics is somewhere between the Lakatosian and Kuhnian theories of science, and is far removed from Karl Popper.

This is not to argue that the construction of models which abstract from some aspects of reality is an illegitimate practice. Behavioural and Post-Keynesian economics, and neuro-economics too, all make use of simplified models, to provide insights and make predictions. It is in the nature of these models that they are, in some senses, bound to be wrong. However, they add value to our understanding of decision making, and of the characteristics of real world economic systems, if their assumptions are broadly consistent with real world empirical observations (often called 'stylised facts'), and if they do not violate important facts or accounting identities which have significant consequences for outcomes that are possible.

At the level of decision making, we ought not to assume a form of rationality which is at variance with what can be known, epistemologically or ontologically, or with what we know of the structure and workings of the human brain. At the level of economic systems, we ought not to ignore crucial accounting relationships at the heart of stock-flow consistency, and the implications of shifting norms for central stock-flow relationships. The incorporation of these

features into our models greatly reduces, as Lance Taylor has said, the degrees of freedom within those models (Taylor, L. 2004). In the end, if there is a conflict between the implications of an accounting identity and a behavioural theory, then, even if the behavioural theory is consistent with empirical data in the short run, in the long run, accounting must win.

This leaves us essentially with three justifications for simplifying assumptions and abstractions in economic theories and models (Keen 2001):

- Firstly, there are assumptions made for pedagogical purposes, which are relaxed at an appropriate later stage in the exposition of a theory, when a more sophisticated model is built on a simpler, introductory one. A famous example of this is Keynes' discussion of effective demand, initially in an ungoverned and closed economy.

- Secondly, there are abstractions made in order to exclude from discussion (or hold constant) variables which do not play a critical role in the phenomenon to be explained or investigated. This has often been used, generally unconvincingly, as a justification for partial equilibrium analysis. Indeed, Keynes used this justification for partial equilibrium modelling, but argued that the factors which had been omitted from a model could be retained 'in the back of the head' and considered when appropriate. It is the weaknesses of the partial equilibrium approach which allowed the rise of general equilibrium analysis, and the gradual take-over of macroeconomics by neoclassical micro-economic theory. The significance of Godley's approach is that it provides heterodox economists with an effective and superior integrated 'general' model to put up against general equilibrium.

- Thirdly, there are assumptions which can be used for the legitimate purpose of identifying the domain within which a theory, and a model used to describe a theory, is valid. For example, modern money theory is only fully valid if you assume an economy with a currency issuing central government, and a floating, fiat currency (that is, a fully monetary sovereign government).

7.3 Godley and Lavoie's PCEX2 Model

I could use any or all three of these approaches to justify a focus at this stage on one of the most simplified and least extensive Godley and Lavoie models - the PCEX2 Model. My intention is to use this small model to describe the DNA of Post-Keynesian SFC models, having already provided a more general analysis of their potential. I will also conduct a small simulation exercise within this model, and justify the results as broadly consistent with much more complex and realistic SFC models, and indeed as a logical consequence of the proper accounting for financial stocks and flows within a macro model. Though very simple, this is highly significant, as the results of the exercise are in total contrast to the predictions of neoclassical dynamic stochastic general equilibrium models. Both also explain and predict the long run futility of an approach to economic management based on interest rate decisions by independent central banks following Taylor-Rule strategies, while, at the same time, governments attempt to achieve futile and self-defeating budgetary and public debt targets and neglect the appropriate use of fiscal policy for the maintenance of non-inflationary full employment.

All of this has been said before, including by Godley and Lavoie themselves. None of it is yet understood by the great majority of economists, either inside or outside academia and policy institutions. A general ignorance of the logical implications of stock-flow consistency, and of the link from SFC to modern monetary theory and the feasibility of tight full employment and an employment guarantee, is undermining the pursuit of the public good in many countries around the world.

It is best to provide a logical explanation within the simplest possible teachable framework – the PCEX2 Model is ideal for the purpose (from chapter four of Godley & Lavoie, Appendix 4.2). This is a model of a pure service economy, with no real assets, therefore no capital investment, and no inventory, no banking system, no financial markets for equities or bonds, no realistic business sector at all, no foreign trade, no inflation, and no productivity growth. It is demand driven, in the simplest sense of the term, where excess capacity is assumed and output and employment react passively to fluctuations in effective demand. All of the above features of a real world economy, can be and are incorporated into more complex stock-flow consistent models, without significantly affecting the conclusions of our simulation exercise below.

The model does incorporate government debt, in the form of interest-bearing one-period treasury bills (so that the issue of capital gains and losses can be ignored), which then allows for household portfolio decisions as in Tobin's models, with household wealth divided between non-interest bearing money and bills.

As in all genuinely Keynesian models of liquidity preference, households first determine their periodic savings, and then allocate their new saving and existing wealth between these two financial assets. The model also incorporates a central bank, described separately from the government by which it is owned. Central bank profits are distributed to the government each period, so that the central bank does not hold any reserves, with its holdings of treasury bills balancing government money in circulation. Given no banking system beyond the central bank, all money is (outside) government money, denoted by *H* (as is common practice, since orthodox economists often incorrectly refer to government money as high powered money).

All stock-flow consistent models, as already explained above, consist of at least three essential elements: (1) a sectoral balance sheet; (2) a transactions-flow matrix, which drives the balance sheet through time; and (3) a set of identities and behavioural equations, which allow us to identify the exogenous variables, determine the endogenous variables, and fully describe the potential evolution of the economic system. More complex models also require a separate accounting for capital gains and losses on financial and real assets.

Static models, such as PCEX2, move towards a steady state over time, for plausible values of their key parameters. This property should not be interpreted as an equilibrium property in any sense. Indeed the concept of equilibrium has no role to play in the PCEX2 model; although market clearing is used in more sophisticated stock-flow consistent models in the context of financial markets, such as the market for equities. It can be shown that what is described below as the fiscal stance of the government, determines the steady state value of effective demand, and therefore GDP and disposable income. The parameters of the Modigliani consumption function subsequently determine a target level of household financial wealth.

In this static model, once this level of wealth has been achieved, households stop net saving. Consequently, the fiscal balance moves to zero, and the model achieves a steady state. This property is obviously not retained in more complex, growth models, where the maintenance of full employment and economic stability is dependent on the active management of fiscal policy, or the existence of effective mechanisms to automatically alter the fiscal stance as needed, to retain effective demand at the full employment level.

The first element in PCEX2 is the sectoral balance sheet (Table 7.1):

Table 7.1: Balance Sheet of Model PC

	Households	Production	Government	Central Bank	Totals
Money	*+H*			*-H*	*0*
Bills	*+B_h*		*-B*	*+B_{cb}*	*0*
Balance (Negative Net Worth)	*-V*		*+V*		*0*
Totals	*0*	*0*	*0*	*0*	*0*

Source: Table 4.1 in Godley & Lavoie, p100

H = government money (the only money in this model)

B = (one period) bills issued by the government

B_h = bills held by households

B_{cb} = bills held by the central bank

V = household wealth = government debt

Every row and each column in the sectoral balance sheet matrix must sum to zero – every row, since each financial instrument is both an asset and also a liability (for example, government money in circulation is an asset for households and a liability for the central bank); every column, since the net worth (net asset value) of each sector is included as a negative item. Since there are no real assets in PCEX2, the system as a whole has no net assets. Private sector net assets and public sector net liabilities balance out.

In this pure service economy, neither non-financial businesses nor banks feature in the balance sheet matrix, and the private sector is made up exclusively by households. The consolidated government sector is comprised of the government and the central bank. To 'finance' spending, the government transfers its bills to the central bank, and then spends the resulting government money into circulation. Households are then free to purchase their desired holdings of bills from the central bank, which leads to the withdrawal of some of the money the government had spent into existence. Households end up each period holding their desired level of treasury bills, and their residual wealth in the form of government money (H). The government money held by households is a buffer stock, in the version of the model I am using, which adjusts in accordance with unexpected changes in income and wealth.

The bills held by the private sector depend on the interest rate set on bills by the central bank, which is the (exogenous) official interest rate in this model. Any bills issued by the government which are not demanded by households are held by the central bank. The core axiom of modern monetary theory clearly holds.

The second element is the transactions flow matrix. It is the transaction flow matrix which embeds the circular flow of income, as recorded in the national income accounts, with the impact of financing and of savings and portfolio decisions on sectoral balance sheets. The transactions flow matrix, along with a separate accounting for capital gains and losses in more sophisticated versions of the general Godley and Lavoie SFC model, drive the balance sheet matrix over time, enabling us to identify apparently unsustainable processes. Moree generally, it allows us to explore the long run implications of implied inter-sectoral financial flows, particularly given the values of key stock-flow targets or norms implied by the structure of the model and plausible values of key parameters within it.

Model PCEX2, and the Model PC ('Portfolio Choice') from which it is derived, have no business sector, and so no column for the business sector in the transactions-flow matrix. In this pure service economy, self-employed households are responsible for production, and require neither fixed capital nor inventories for the purpose. Production is for the purpose of meeting consumption demand, and government purchases. The simplest Keynes-Kalecki assumption of demand-driven output, based on excess capacity and constant prices, is made.

It is important to note that these simplifying assumptions are relaxed in more complex versions of the model, including open-economy and growth models, without significantly

affecting the simulation result discussed below. It needs to be re-iterated that this version of the model has been selected because it is essential for the insights of stock-flow consistent macroeconomics to be explored within a framework which is simple enough to be used with undergraduate economics students. We must have a model which can be depicted graphically, as this one can (Godley & Lavoie pp 120-121), and that graph must be accessible to those who only ever study economics as a non-specialist. After all, it is the simplicity of the basic neoclassical framework which is amongst its greatest strengths, and needs to be matched.

Modern money provides an accessible intellectual framework. The stock-flow consistent shifting balance sheet framework in advanced models provides a methodology to challenge dynamic stochastic general equilibrium, and can be consistent with the use of appropriate econometric methods. This PCEX2 model is a simplified form of this framework, which can be easily understood, analysed diagrammatically, and be subjected to an analytical solution to identify the determinants of steady-state values.

As in all these models, net sources of funds are denoted as positive entries, and net uses as negative entries. Therefore, in every column and every row, negatives and positives must cancel out, so that all rows and all columns sum to zero. For example, in the production column, consumption and government spending are the sources of GDP. In the consumption row, households use funds to finance consumption (*-C*), and consumption is a source of GDP (*+C*).

In the household column, disposable household income in this model is comprised of income from current production (*+Y*), plus interest received on treasury bills) (*+* $r_{-1}.B_{h-1}$). In more sophisticated models, there are more sources of household income, including distributed profits from business organisations, and interest on bonds and on bank deposits. In addition, and in contrast to most neoclassical models, since businesses are not simply seen as an extension of households in Godley and Lavoie (or indeed generally in Post Keynesian models), there is no assumption in more sophisticated models that all business profits are distributed. Indeed, retained earnings play an important role in financing capital investment in such models, as they undoubtedly always do in all real world capitalist economies.

Uses of funds for households include consumption, taxes that need to be paid (-*T*), and net increases in assets held ($-\Delta H$ and $-\Delta B_h$). These final two entries add to household wealth, and transform the households column in the balance sheet matrix between points in time. In more complex models, there are a wider range of available financial assets, real assets, and liabilities resulting from bank loans or other forms of borrowing.

The balance sheet matrix records stocks of net assets and liabilities at a point in time. The transaction-flow matrix records economic transactions, and flows of funds between sectors, causing changes in values within the balance sheet matrix. Behavioural equations, which incorporate target values, or norms, for variables such as household net worth to disposable income, have implications for the potential evolution over time of the economy. The same also applies to the likely long run instability of short run empirical relationships, such as any link from nominal or real interest rates to aggregate demand, which is the core aggregate

demand relation in neoclassical dynamic stochastic general equilibrium models.

Table 7.2: Transactions-flow matrix of Model PC

	Households	Production	Government	Central Bank		Totals
				Current	Capital	
Consumption	*-C*	*+C*				*0*
Government expenditures		*+G*	*-G*			*0*
Income = GDP	*+Y*	*-Y*				*0*
Interest payments	*+* $r_{-1}.B_{h-1}$		*-* $r_{-1}.B_{-1}$	*+* $r_{-1}.B_{cb-1}$		*0*
Central bank profits			*+* $r_{-1}.B_{cb-1}$	*-* $r_{-1}.B_{cb-1}$		*0*
Taxes	*-T*		*+T*			*0*
Change in money	$-\Delta H$				$+\Delta H$	*0*
Change in bills	$-\Delta B_h$		$+\Delta B$		$-\Delta B_{cb}$	*0*
Totals	*0*	*0*	*0*	*0*	*0*	*0*

Source: Table 4.2 in Godley & Lavoie, p 101

The Government and Central Bank columns within the matrix are also worthy of examination. Sources of funds for the Government include taxation, the issue of bills, and central bank

profits. Since central bank profits in this model equate to interest payments made by the Government on that portion of its notional debt which is held by the central bank, this is an artefact of accounting for central banking operations separately from those of the rest of the Government. It obscures the fact that bills held by the central bank are necessarily equal to household holdings of government money.

Since government money in this model is non-interest bearing, this portion of the government 'debt' is non-interest bearing, and its issue represents seignorage. All government debt held by central banks, whether as here directly purchased from governments, or in reality purchased on the secondary market as part of central bank liquidity management and interest rate maintenance operations, represents seignorage.

More sophisticated stock-flow consistent models require a separation of business transactions into current and capital account columns – notably, so that investment spending can be simultaneously represented as a source of demand and income (in the 'current account'), and a use of funds which needs to be financed (in the 'capital account'). This approach also allows for a clear separation of entrepreneurial profit (a use of funds in the 'current account' column) into distributed profit (going to households) and undistributed profit (a source of funds in the 'capital account' column of the business sector).

In this simplified model, with no separate business sector, the separation of current and capital transactions is made for the Central Bank. The current transactions of the Central Bank are simply the receipt of interest from the Government on that portion of the bill issue held by the Central Bank, and the return of the same sum to the Government in the form of central

bank profits (none of which are retained in the model, as central banks do not require reserves). On the capital account, central bank assets increase by the change in the bills held by the central bank, and its liabilities increase by the change in the amount of government money held by households. Given the zero net worth of the Central Bank in the model, these amounts must clearly always be equal. The idea is that the central bank sets an official interest rate on treasury bills, and 'buys up' any bills issued by the Government which households do not wish to hold at this interest rate.

7.4 Consolidating the Central Bank into the Government Sector

The main impact of the separation of the Central Bank from the Government, in this model, as in general practice, is to obscure the reality of modern money. Suppose we were to integrate them into a consolidated Government sector:

Table 7.3: Simplified Balance Sheet of Model PC, with consolidated Government Sector

	Private Sector	Government Sector	Totals
Money	*+H*	*-H*	*0*
Bills	*+B_h*	*-B_h*	*0*
Balance (Negative Net Worth)	*-V*	*+V*	*0*
Totals	*0*	*0*	*0*

Table 7.4: Simplified Transactions-flow matrix of Model PC, with consolidated Government Sector

	Private Sector	GDP	Government Sector	Totals
Consumption	*-C*	*+C*		*0*
Government expenditures		*+G*	*-G*	*0*
Income = GDP	*+Y*	*-Y*		*0*
Interest payments	*+ $r_{-1}.B_{h-1}$*		*- $r_{-1}.B_{h-1}$*	*0*
Taxes	*-T*		*+T*	*0*
Change in money	$-\Delta H$		$+\Delta H$	*0*
Change in bills	$-\Delta B_h$		$+\Delta B_h$	*0*
Totals	*0*	*0*	*0*	*0*

This would greatly clarify the claims of modern monetary theory. This is because non-government sector net financial wealth is more clearly identified as being comprised of the net liabilities of the government sector. The need for government liabilities to increase to enable non-government net saving to occur (where net saving exists as modern monetary

theorists define it) is even more clearly explained. The fact that all net government spending creates government money, and that government debt is issued for the purpose of interest rate maintenance and to supply nominally safe interest-bearing assets to the non-government sector, and not for the purposes of 'funding' government spending is evident. The core axiom of modern monetary theory becomes obvious. All this is the result of consolidating central bank and government balance sheets and transactions flows.

7.5 Equations of PCEX2

However, in PCEX2, they are kept separate. To complete the model, we need to describe its behavioural equations and identities.

$$Y = C + G \tag{7.1}$$

Equation (7.1) is the national income accounting identity for Gross Domestic Product, given the exclusion of both investment spending and foreign trade from this closed, pure service economy model.

$$YD = Y - T + r_{-1}.B_{h-1} \tag{7.2}$$

Equation (7.2) describes private sector disposable income. This includes interest income on government debt, based on the interest rate on bills and the value of bills held at the end of

the previous period. It is sometimes forgotten that it is the universal practice in national accounting to exclude interest payments and all purely financial transactions from GDP, since they are classified as transfers. It is relevant to highlight this, as it can mislead economists into ignoring the stimulative effect of government interest payments on private sector disposable incomes and therefore on consumption. These interest payments should not be seen as a transfer from taxpayers to debt holders, as these payments, like all government spending, involve the injection of new government money, and do not necessarily imply any increased burden on taxpayers.

$$T = \theta.(Y + r_{-1}.B_{h-1}) \ , \ \theta < 1 \qquad (7.3)$$

Equation (7.3) determines the tax to be withdrawn from the system each period, as a proportion of disposable income. Interest income paid out to holders of government securities is subject to taxation, and so is partially withdrawn again.

$$V = V_{-1} + (YD - C) \ , \text{or} \quad \Delta V = (YD - C) \qquad (7.4)$$

Equation 7.4 shows how household wealth increases over time, by the gap between disposable income and consumption. In more complex models, wealth also changes as a result of capital gains, which can be included as an element in a Hicksian (or what Godley and

Lavoie call a Haig-Simons) definition of disposable income. Given no capital gains, the change in wealth is identical to household savings.

$$C = \alpha_1 . YD^e + \alpha_2 . V_{-1} \qquad (7.5)$$

Consumption depends on both expected disposable income, which, in a model with capital gains, would be Hicksian disposable income, and lagged wealth (Equation 7.5). The marginal propensities to consume are, as would be expected, both less than one, with the marginal propensity to consume out of expected income higher than the marginal propensity to consume out of wealth.

By assuming realised expectations for disposable income, we can combine the consumption function (7.5) with the savings identity (7.4). This generates what Godley and Lavoie call a wealth accumulation function, but is more simply described as a savings function (see equation B below). Assuming this model has reached a steady state, which in a model with no trend for growth means steady GDP, disposable income and wealth will all be constant (*ΔV=0*). This generates the following expression for a steady state (or target) wealth to disposable income ratio (equation A):

(A) $\frac{V^*}{Y_D^*} = \frac{1-\alpha_1}{\alpha_2} = \alpha_3 .$ (Target wealth to disposable income ratio)

(B) $\Delta V = \propto_2 (\propto_3 . YD - V_{-1})$ (Wealth accumulation or savings function)

The target wealth to disposable income ratio (α_3) is a significant norm in all the Godley and Lavoie models. At this stage, the above equations remind us of the separation of the consumption/savings and portfolio choice decisions in Post-Keynesian models. Equations (7.4) and (7.5) (or equations A and B) determine current financial wealth, and any additions to current wealth. The allocation of that wealth between available financial assets remains to be determined.

Portfolio decisions in Godley and Lavoie's models follow the principles outlined by Tobin and others in a series of influential papers, starting with Brainard and Tobin (1968). In the PCEX2 model, there are only two available assets, which greatly simplifies the exposition of these principles and allows for a discussion of the transactions, speculative and precautionary motives for holding liquidity, as identified by Keynes.

$$\frac{B_d}{V^e} = \lambda_0 + \lambda_1 . r - \lambda_2 . \left(\frac{YD^e}{V^e}\right) \qquad (7.6)$$

The ex-ante demand for bills, as a proportion of anticipated wealth, is a positive function of the rate of interest on bills and a negative function of the expected disposable income to wealth ratio.

$$H_d = V^e - B_d \qquad (7.7)$$

In the simulation model for PCEX2, the ex-ante demand for government money must be defined as the residual, when the demand for bills has been deducted from anticipated wealth. This is essential for consistency, given that the model only includes two financial assets. However, a similar condition will apply in more sophisticated models, where the demand for one element in household financial wealth must always be determined as a residual, for correct accounting.

For example, the demand for money might be given as financial market wealth, less equities, bonds, and bills, in a more sophisticated version, but it would always remain a residual.

$$\text{(C)} \quad \frac{H_d}{V^e} = (1 - \lambda_0) - \lambda_1 . r + \lambda_2 . \left(\frac{YD^e}{V^e}\right)$$

Equation C describes the determinants of the ex-ante demand for government money, using Tobin's principles. The λ_1 coefficient appears as a positive in equation (7.6) and a negative in equation C, and can be interpreted as determining Keynes' speculative demand for money and for bills. Government money in this model (as in the *General Theory*) is non-interest bearing, and the only interest rate is the (official) interest rate on bills. The sum of the coefficients of any right hand side variable must sum to zero, in a set of portfolio choice equations, since, in this model, a proportionate increase in the share of wealth held in one

form must imply the same proportionate decrease in the share of wealth held in the other form.

Similarly, the λ_2 coefficient, which describes the transactions demand for money, appears as a positive in equation (C) and a negative in equation (7.6). The right hand side variable is the anticipated disposable income to wealth ratio, which, in the steady state, tends towards the reciprocal of α_3.

The intercept terms, λ_0 and (1-λ_0), must sum to 1, since all wealth in this model must be held in either government money or bills. Intercept terms in more realistic financial systems must sum to 1, for the analogous reason. This intercept term can be varied as the precautionary demand for money changes, thus reflecting the impact of Keynesian uncertainty on portfolio decisions.

An increase in uncertainty in this model could lead firstly, to an increase in saving due to a fall in both marginal propensities to consume, and secondly, to an increase in liquidity preference, and therefore an increase in the proportion of wealth held in the form of government money, and an identical a decrease in the proportion held in bills.

In more complex models, private sector decision makers cut spending and planned investment and increase their savings propensity. They also shift out of asset classes such as equities and into more liquid assets, such as government securities and money. They seek to shift their balance sheets away from speculative or even Ponzi positions, towards hedge

positions, and repay debts. This decreases the money supply, while driving down speculative asset markets such as equities, and potentially creates a Fisher-Minsky debt deflation.

The approach to financial modelling in Godley and Lavoie, informed by Tobin's work, facilitates the exploration of such issues clearly and with a realism which is impossible in models constructed in the general equilibrium condition, where, instead, uncertainty and realistic financial institutions and markets are absent. Even in the highly simplified PCEX2 model, we can see the beginnings of a framework allowing for a productive analysis of potentially unsustainable processes and practices, and the potential emergence of Minskian financial fragility.

$$H_h = V - B_h \tag{7.8}$$

Model PCEX2 incorporates expectations, and the likelihood of unfulfilled expectations with respect to disposable income and therefore wealth. In this model, the reasonable assumption is made that unexpected changes in income and wealth will be absorbed in unanticipated changes in government money holdings by households.

$$B_h = B_d \tag{7.9}$$

Equation (7.9) states simply that ex-post holdings of bills are equal to the ex-ante demand for bills, as given by equation (7.6).

$$\Delta B_s = B_s - B_{s-1} = (G + r_{-1}.B_{s-1}) - (T + r_{-1}.B_{cb-1}) \quad (7.10)$$

Equation (7.10) is misleadingly referred to as the 'government budget constraint' in Godley and Lavoie. As discussed in the previous chapter, the use of appropriate language and the avoidance of inappropriate metaphors are important, if we are to convince policy makers, their advisors, and the broader public of the need to take seriously modern money, and more broadly a realistic description of the macro-economy. By now, it should be clear that monetary sovereigns face no financial budget constraint. This is as true in this closed economy model, as it is in an open economy model with a floating exchange rate regime. Equation (7.10) can more correctly be described as a 'fiscal identity', where ΔB describes an increase in gross bill issuance, including bills held by the central bank (which should not be viewed as an element in net government debt). In an accounting sense, it is 'backing' the issue of government money to the private sector.

Since, in this model, the central bank automatically holds those bills not demanded by the private sector at the official interest rate, the government is always able to 'finance' additional spending and can never 'run out of money' and become insolvent. This simple and obvious

fact, which has been described as the core axiom of modern monetary theory, can be obscured by separately accounting for central bank activities, but remains a truism.

$$\Delta H_s = H_s - H_{s-1} = \Delta B_{cb} \qquad (7.11)$$

Equation (7.11) states that, in this model, net government money issuance is by definition equal to the increase in the value of government debt held by the central bank. In real life, central bank transactions in other assets, including private sector securities and foreign currency; any central bank lending to the private sector; and changes in the government's accounting balance at the central bank, also have an impact on government money creation.

The fact that central bank purchases of government debt increase the supply of government money does not depend on whether the central bank purchases these bills directly from the government (in the primary market), or whether the purchases arise as a more obvious consequence of interest rate management in the secondary market. In effect, the government's deficit spending remains 'monetised' in either case. To read the published descriptions of interest rate management operations and the role of transactions in government securities provided by central banks, it is as though some central bankers themselves do not understand this. It is common to see a statement along the lines that the direct purchase of government securities on the primary market are avoided due to the principles of 'sound finance', which is in itself a meaningless term, but often implies a

resistance to the logic of functional finance, or modern monetary theory. Purchases of government debt on the secondary market, given the current approach to interest rate management in most countries, amount to the same thing.

$$B_{cb} = B_s - B_h \tag{7.12}$$

Equation (7.12) states that bills held by the central bank are given by total bills issued, less the demand for bills from the private sector at the central bank's official interest rate target.

$$r = \bar{r} \tag{7.13}$$

The interest rate target is easily met by varying the mix of interest bearing bills and, in this model, non-interest bearing government money held by the private sector. For many years, neoclassical economists continued to view even short term interest rates as market determined, and the money supply as the autonomous policy variable. The persistent failure to hit targets for broad money supply growth during the 1970s and 1980s weakened this view amongst some economists, and led policy makers to abandon this version of 'monetarism'.

The consequences for short term interest rate volatility of attempts to control the supply of government money (generally named 'high powered money' or 'base money'), most notably

at the Federal Reserve under Paul Volcker from 1980-82, demonstrate that the demand for cash reserves in the banking system is both too unstable and too interest inelastic to allow for 'monetary base control' without the immediate threat of a financial crisis.

Central bankers, and eventually and reluctantly nearly all macroeconomists were forced to admit that short term (policy) interest rates had always been, and remained necessarily, the autonomous policy instrument. Moreover, they had to concede that central banks must somehow accommodate fluctuations in the demand for reserves by the banking system (or at least ensure that sufficient reserves are supplied) to allow for financial stability.

The determination of nominal interest rates by the central bank leads to disturbing conclusions in the neoclassical model, given the link between the real interest rate and aggregate demand, and the predictions of the expectations augmented Phillips curve for accelerating inflation when demand exceeds potential output. It implies that the central bank, by setting a nominal interest rate which is too low (with a real interest rate below the Wicksellian 'natural' level), could create the conditions for explosive, accelerating inflation.

The famous 'Taylor Rule' equation was the solution to this difficulty, which re-endogenised an exogenous policy variable, by determining it within an equation that took the gap between inflation and an inflation target, and the output gap, into account. Unfortunately, the 'natural rate hypothesis' and the New Keynesian aggregate demand curve, and consequently the economics underlying the Taylor Rule, have been shown to be contradicted by empirical evidence. A good example of this is the false idea that an output gap implies continuously accelerating inflation. Yet it can still be found in text books, and even advanced models.

Post Keynesians, including Godley and Lavoie, generally have a 'conflicting claims' view of the inflationary process. In more advanced versions of their models, they incorporate a Phillips Curve with a horizontal segment, as supported by a great deal of research. This is where excess demand can lead to rising inflation, but does so by changing real wage targets in the labour market, and therefore labour costs, and prices set on margins above normal unit costs.

The central bank is able to determine the short term interest rate. However, the effect of changes in this interest rate on consumption and effective demand is not the one implied by orthodox neoclassical general equilibrium models. The apparently 'perverse' (compared with the predictions of DSGE models) long term impact of changes in interest rates in stock-flow consistent models is of considerable significance for economic management in Australia and many other economies in the immediate future.

Indeed, this is perhaps the most vital lesson to be learned from a correct accounting of stocks and flows which has not been taken on board yet by policy makers and their economic advisors. It has led, and is still leading, to serious mistakes in economic policy.

$$YD^e = YD_{-1} \qquad (7.14)$$

The impact of mistaken expectations on government money holdings and therefore on household wealth in this model, and the use of similar shock absorbers for the consequences

of uncertainty and unrealised expectations in more advanced stock-flow consistent models, implies that the precise formulation of expectations in these modes is at most of secondary importance. As Godley and Lavoie argue, any mechanism for forming expectations which is not perverse is acceptable. In this simple model, it will have no long run impact on the model's steady state.

This does not remain true in models with sophisticated, speculative financial markets, or productivity growth which is determined by past levels of capacity utilisation. Such models exhibit path dependence, or hysteresis, and potentially complex outcomes. Models with such properties are interesting, and can provide convincing explanations of phenomena like bubbles and crashes, and financial instability in general (Keen 2011). However, that is not the purpose of the Godley and Lavoie models, which despite indicating the likely sustainability of current policy settings, and the potential for an approach to policy to eventually break down, do not in themselves shed light on the stock market or real estate bubbles.

The models are not forecasting models. They are simulation models - models of what might possibly happen and not of what will happen. The importance of the Godley and Lavoie method is that it allows their use to describe what *cannot* happen, and often the advice and forecasts of New Keynesian economists have been based in recent years on long term projections which are simply inconsistent with what is possible, given a correct accounting for stocks and flows.

$$\alpha_1 = \alpha_0 - \iota . r_{-1} \qquad (7.15)$$

In the more sophisticated models, there are a variety of mechanisms whereby a reduction in nominal and/or real interest rates can temporarily stimulate aggregate demand. Lower interest rates can drive up asset values, and potentially encourage a speculative bubble. They can also reduce the burden of debt repayments on households and businesses which are liquidity constrained; increase the demand for new credit; put downward pressure on exchange rates and stimulate net exports. In the PCEX2 model, none of these mechanisms exist. Instead, the short run stimulus from a reduction in the policy interest rate is described in equation (7.15). The marginal propensity to consume out of disposable income is negatively related to the rate of interest. This ensures a (temporary) increase in consumption following a reduction in the interest rate.

We now have sufficient equations to determine all the endogenous variables in the model. Equation (7.16), then, is a redundant equation. It specifies that the money holdings of households must always equal the supply of government money. Both variables have already been determined above, and so (7.16) cannot be included in the simulation model for PCEX2, as it would lead to the model being over-determined. Nevertheless, the correct accounting of this stock-flow consistent model guarantees the following will always hold.

$$H_s = H_h \qquad (7.16)$$

The presence of a redundant equation in the model is reminiscent of Walras' Law in general equilibrium models, and is sometimes labelled a quasi-Walrasian condition. But it is not an equilibrium condition in any sense, and is simply a result of correct accounting. There will always be a redundant equation in any stock-flow consistent macroeconomic model, and the fact that the data always satisfies the equation is a check on correct accounting within the model.

To run model PCEX2, or any stock-flow consistent simulation model, it is necessary to select values for the parameters in the behavioural equations (α_0, α_2, λ_0, λ_1 and λ_2) and for the policy variables (*G, Θ,* and r). The model is then run until, in the models with no trend growth, such as PCEX2, it reaches a steady state. The steady state in such models exists when the endogenous variables have reached a constant level.

For constant values of *Y, YD, C, V, B* and *H* in PCEX2, household wealth will have reached a steady state with household saving equal to zero (*ΔV=0*) . This implies *C = YD = YD*^{e}, and therefore that (for constant r, and no change in liquidity preference) *ΔH* and *ΔB* are both 0. The fiscal balance will be zero. This allows for the straightforward analysis of steady state values within the model.

It was simple for Godley and Lavoie to derive an expression for steady state GDP (7.17):

$$Y^* = \frac{G+r.B_h^*.(1-\theta)}{\theta} = \frac{G_{NT}}{\theta} \qquad (7.17)$$

where G_{NT} is total consolidated government outlays, and the ratio of government outlays to the tax rate is defined as the 'fiscal stance'. In this simple, static, and closed economy model, this ratio determines the steady state level of GDP. Even in open economy models, and in growth models with sophisticated modelling of and accounting for inflation, the fiscal stance is a key variable in all stock-flow consistent models for determining steady state output.

Interest rates play a paradoxical role in the steady state solution – with decreases in interest rates being contractionary, since they reduce interest transfers from the government to the private sector. The implications of stock-flow consistency are that the neoclassical view regarding the relative efficacy of fiscal and monetary policy is exactly wrong, at least in the long run. The government budget, and in particular the rarely discussed fiscal stance – which can be defined as the value for GDP at which the government budget would be balanced – is closely connected to effective demand. Ricardian equivalence and most if not all other stories of 'crowding out', while spare capacity exists, are fallacious. Interest rate cuts, including decreases in real interest rates in more sophisticated models, may have the impact predicted by neoclassical models in the short run, but in the long run are 'perversely' contractionary.

7.6 Simulation of a Fiscal Tightening with Interest Rate Cuts in PCEX2

The impact of falling interest rates over time, or the transmission mechanism for monetary policy, differs in its details between this static model and a more fully realistic extensive macro model. However, the general predictions hold in all genuinely stock-flow consistent models

of the economy. Since they are of vital importance for economic policy, and since the problems caused by advice based on misleading neoclassical modelling is becoming clear to more people as the years go by, I will now use Model PCEX2 to run the relevant simulation.

The Australian Government in its proposed budget for 2014/15, announced plans for an significant tightening of fiscal policy, with the implicit 'Ricardian' promise that there would be no long run impact on aggregate demand and output, or that any impact of a tighter fiscal stance on aggregate demand could be offset by a looser monetary policy (Australian Government 2014). It is interesting to examine the consequences of such a policy mix for aggregate demand, and the implied consequences for employment and prosperity, even within a (very slightly) amended version of PCEX2.

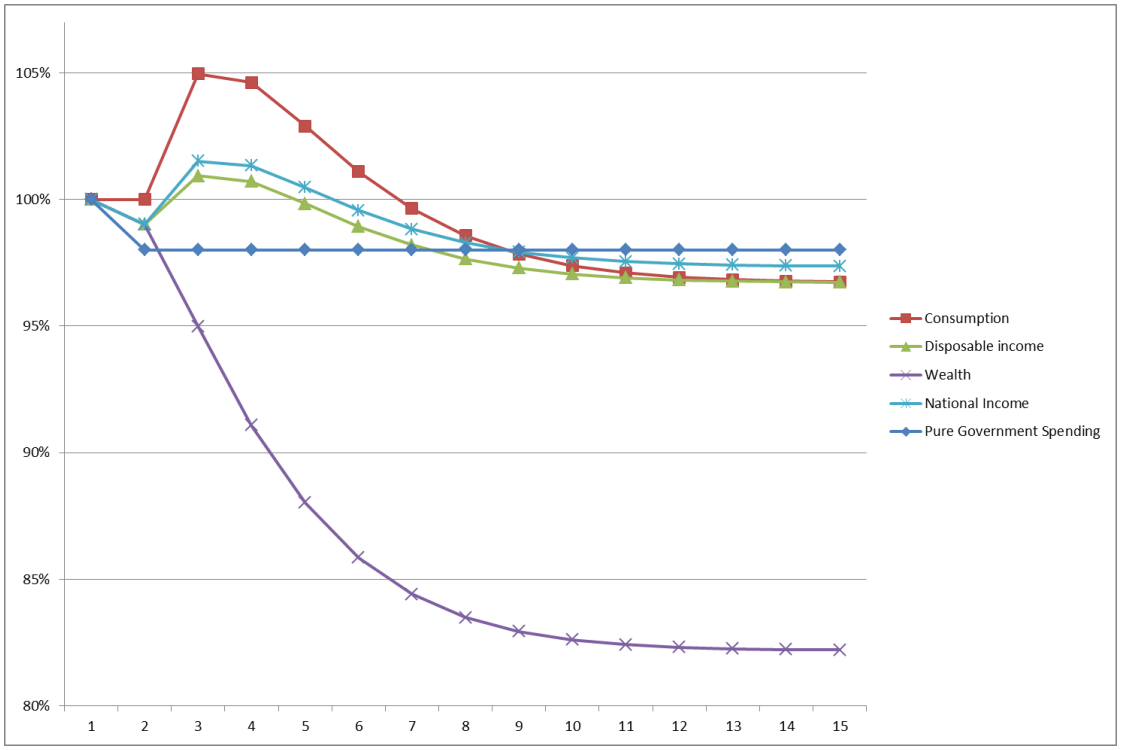
> **"The Government's fiscal strategy reflects a commitment to maintain the strong fiscal discipline required to pay down debt. This is a necessary part of reducing the Government's share of the economy over time in order to free up resources for private investment to drive jobs and economic growth, and live within our means".**
>
> (Australian Government Budget Papers 2014, p 500)

The following simulation is based on a 2% cut in pure government spending in the PCEX2 model, combined with a cut in the policy interest rate which is sufficient in the short run, given the assumed parameters, to more than offset the initial contractionary effect of the fiscal tightening – this being a cut in the rate of interest in this model from 2.5% to 1%.

The results are not intended to be interpreted as forecasts, but as simulations within a highly simplified model, where values have been selected for key parameters to create a plausible frame for simulations. The advantage this model has over even highly sophisticated general equilibrium models of the economy, is its correct accounting for stocks and flows. The logic of stock-flow consistency constrains what is possible over time. In this case, Figure 7.1 demonstrates that the output and employment impact of a a significant fiscal contraction can be more than offset in the short run by a large enough cut in interest rates. However, this 'expansionary austerity', which in the real world is also possible when combined with cuts in unit labour costs given prosperous trading partners to whom you can net export, can at best be temporarily effective. In the long run, the decrease in private financial wealth and interest payments from the public sector, which are the results of a shift in the fiscal balance towards surplus and the reduction in interest rates from 2.5% to 1%, is contractionary. This is because private spending eventually falls and the reduction in output relative to the benchmark is in consequence a multiple of the reduction in public spending.

The time periods on the horizontal axis can be interpreted as 'years', which, given the parameters of the mode, implies a mean lag for the impact of permanent changes in government spending and resulting wealth effects on the economy of approximately two years. The parameters of the model, as it is employed here, include a marginal tax rate of 50%, selected to provide a more plausible lag for the impact of the policy mix.

Figure 7.1: Simulation of a 2% Fiscal Tightening, with an Interest Rate Cut from 2.5% to 1% in Model PCEX 2, with an assumed 50% marginal tax rate.



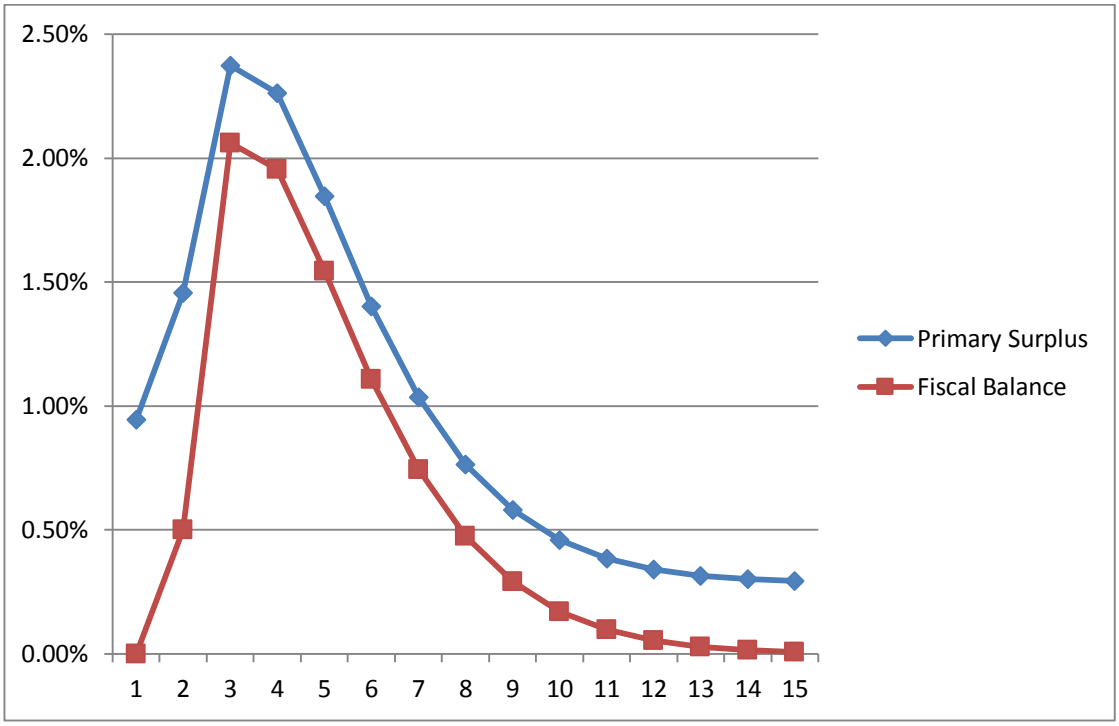
As Figure 7.1 shows, the cut in pure government spending occurs during the second year, initially reducing national income by the reduction in government spending, and reducing disposable income by half that amount in dollar terms (given a marginal tax rate of 50%). Consumption rises by almost 5% the following year, despite the drop in disposable income and in household wealth, because, in this model, the cut in the rate of interest from 2.5% to 1% raises the marginal propensity to consume out of expected disposable income from 0.6 to 0.66. Beyond year three, consumption rebounds, due to falling wealth and disposable income, driven by fiscal surpluses reducing the supply of government securities to the private

(household) sector, and to the impact of falling interest income from those government securities.

After approximately 10 years, this static and simplified model is approaching a new steady state, with significant decreases in national income, and in disposable income and consumption, and a catastrophic reduction in household wealth of almost 18%.

Another logical result is that the fiscal deficit moves back over time to its initial level, which is a fiscal balance of zero in this model, but would be a fiscal deficit in a more realistic growth model, where the demand for net financial assets from the non-government sector rises with nominal GDP (Figure 7.2). The fiscal tightening has no permanent impact on the annual balance of government spending plus debt service less taxation net of transfers, which is itself driven by non-government net saving and portfolio preferences.

Figure 7.2: Evolution of Fiscal Balances in the Simulated Tight Fiscal/Loose Monetary Policy Mix in PCEX2



While the transmission mechanisms for fiscal and monetary policy are far more complex in Godley and Lavoie's more sophisticated 'Growth Model Prototype', as well as in any attempt at a more realistic stock-flow consistent model of the economy, including the one in the appendix to this chapter, the same essential logic applies. The fiscal stance of the government is the key driving force behind aggregate demand, while monetary policy, despite potentially having the effect predicted by orthodox models in the short run, has the opposite effect in the long run.

> **"When there is economic growth without government deficits, this implies that the balance sheets of the private agents are getting modified, as more private claims are being accumulated, while the private sector is holding less claims over government liabilities. In other words, private debt must grow faster than the rate of growth of the flow of output"**
>
> (Godley and Lavoie 2007, p 98)

The above comment by Godley and Lavoie is necessarily true, in the absence of a current account surplus, assuming that the sum of private and public financial liabilities rises at least in proportion with GDP. In recent decades, it has increased more quickly than this. Growing ratios of private debt to GDP have been a consequence of economic management based on an aspiration to fiscal surplus, and a reliance on monetary policy to steer the rate of growth of total spending in an increasingly financialised economy.

Monetary policy decisions are not an effective mechanism for managing aggregate demand in an unstable economy. Fiscal policy, while subject to the well-known recognition, implementation and operational lags, can at least in theory perform the role orthodox economists generally assign to monetary policy, which is that of medium term stabilisation. Indeed, in stock-flow consistent models, it is the only sustainable mechanism for the maintenance of non-inflationary full employment. The potential for a job guarantee scheme to add to the automatic fiscal stabilisation of a strongly progressive tax and welfare system is clear.

7.7 A Fiscal 'Taylor Rule' and Fiscal Sustainability in a SFC Model with a NAIRU

Godley and Lavoie (2007a) clearly demonstrate the potentially stabilising role of a counter-cyclically evolving fiscal balance, by incorporating into a stock-flow consistent model the neoclassical characteristics of a 'natural' level of output and employment and an accelerating-inflation Phillips Curve. They do this not because they accept the validity of the natural rate hypothesis or the associated expectations augmented Phillips Curve, but simply to demonstrate that stock-flow consistency requires the active use of fiscal policy in demand management even in a hybrid model, with these neoclassical characteristics.

They define a fiscal policy reaction function, analogous to the Taylor Rule reaction functions used in mainstream models to describe central bank decisions on nominal and real interest rates. The Godley-Lavoie fiscal reaction function is given as follows:

$$g_{gr} = gr - \beta_1 \,.\Delta\pi_{-1} - \beta_2.\,(\pi_{-1} - \,\pi^T)\,, \tag{7.18}$$

so that

$$g = g_{-1}.(1 + g_{gr}) \tag{7.19}$$

The second expression simply states that real pure government spending (government purchases, with no interest payments) increases from one period to the next at a policy determined rate of g_{gr}. The first expression is the Godley-Lavoie-Taylor rule that specifies the growth in pure real spending as the trend growth rate in 'natural' output, adjusted for any

acceleration of (or deceleration in) the inflation rate in the previous period, and for the gap between inflation and its target value.

Given the following Phillips Curve equation:

$$\Delta\pi = \varepsilon + \gamma.(y - y_{fc})/y, \qquad (7.20)$$

where ε is a cost-push variable (and can be set equal to zero), the fiscal policy reaction function can be written in a form even more reminiscent of the Taylor Rule of the 'new consensus':

$$g_{gr} = gr - \beta_1 .\gamma.(y_{-1} - y_{fc,-1})/y_{-1} - \beta_2.(\pi_{-1} - \pi^T) \qquad (7.21)$$

where y_{fc} is the 'natural', or non-accelerating inflation, level of output; and the subscript, *-1*, refers to the previous period.

The growth rate in pure government spending depends on the output gap and the deviation of inflation from its target. The rate of growth of pure real government spending is set above the trend rate of growth in (the neoclassical version of) full employment output when output has been below full employment (so that inflation will have been decelerating, in this model) and inflation has been below target. It is set below trend growth when inflation has been above target and has been accelerating (i.e., where there is an inflationary gap).

Godley and Lavoie use simulations to demonstrate that such a rule can be used successfully in a stock-flow consistent quasi-neoclassical model such as this one. Moreover, they also use the model to demonstrate that the standard orthodox argument relating to explosive public debt to GDP ratios when real interest rates exceed the trend growth rate in the economy is invalid.

The argument is a familiar one – that a primary budget balance of zero implies a continuously growing government debt ratio, where interest rates exceed growth rates, and where the rate of interest describes the rate of growth of government debt under these circumstances.

Godley and Lavoie show that in a model where pure government spending is set in order to keep the economy at full employment, the stimulative effect of interest payments and a rising public debt on private demand pushes the primary budget balance into surplus, thus eventually stabilising the government debt to GDP ratio. This is regardless of how high the rate of interest on the debt is, relative to trend economic growth. This is an important result, and not one which is widely understood.

It is one which I made reference to in my previous chapter, when discussing Fischer and Easterly's 1990 paper on the (so-called) *Economics of the Government Budget Constraint.*

Recalling equation (6.6a), $s_t = d_{t-1}\,\frac{(r_t - g_t)}{(1+g_t)}$, where *d* is the ratio of government net debt to GDP; *s* is the primary surplus; *r* is the average real rate of interest on the government's net financial liabilities; and *g* is the rate of growth in real GDP, Godley and Lavoie's model confirms what we have already logically established. As long as the fiscal stance is set at the level

necessary to maintain the full employment level of output, then a rate of interest on government debt set above the rate of growth of the economy does not imply an exploding debt ratio. It merely implies the development of a primary surplus.

This is notwithstanding the ability for a monetary sovereign to set its own interest rate, or indeed to arrange economic management so as to not emit any interest bearing liabilities, which, as we know implies, a zero official interest rate. This has potential implications for exchange rates, asset markets, financial regulation and indeed appropriate fiscal policy, but it emphasizes again the core axiom of modern monetary theory.

Godley and Lavoie's economics, as I have stated, is firmly rooted in the Keynes-Kalecki inspired Post-Keynesian school. As such, they accept as realistic neither the natural rate hypothesis, with its basis in the money neutrality, gross substitution, and ergodic axioms; nor the accelerationist expectations story of inflation, which was introduced into economics by Friedman and Phelps. The latter is not supported by the empirical evidence, and yet remains an essential element in new consensus dynamic stochastic general equilibrium models up to the present day.

In their more sophisticated models, Godley and Lavoie build in a Phillips Curve with a horizontal segment, justifying this with references to some of the many empirical studies which have provided support for this approach. I will refer to the same model of inflation in the remaining chapter, when I discuss the virtues of a job guarantee. They describe inflation as a conflicting claims process, with money wages determined in the labour market, but with real wages determined in the goods market, based on normal unit cost plus pricing and a

mark-up which reflects the need to justify past financing decisions and to contribute retained earnings towards current investment financing.

A Kaleckian interpretation of the mark-up implies that changes in the achievable mark-up and profit share also reflect the 'degree of monopoly' in the economy. Globalisation and increasingly footloose capital has greatly increased the degree of monopoly since the 1970s, and has consequently increased the share of capital and reduced the share of labour in national income in virtually all high income economies.

This has opened up a gap between the growth in labour productivity and median real hourly wages, which has contributed towards growing income inequality in most countries. It has helped to limit money wage increases, and consequently limited social conflict driven cost-push inflationary pressures and contributed towards the so-called 'great moderation'. It has also contributed towards the pressure to deregulate financial institutions and markets, and to take a benign attitude to growing private sector, and particularly household, indebtedness.

Progressive financial deregulation, shifting private balance sheets, and growing financial fragility are consistent with a Minskian story of money-manager capitalism, and Keen's description of growth in aggregate demand being driven by accelerating private debt. A sophisticated understanding of modern economies and financial systems must incorporate Minsky's insights, and also Kaldor and Godley's sectoral balances approach, and the recently developed stock-flow consistent models, which have again been pioneered by Godley. Useful macroeconomic models should be capable of explaining and even predicting financial

instability; they should incorporate instability thwarting mechanisms, such as counter-cyclical fiscal policy; and they should account correctly for stocks and flows.

If, as I maintain I have established, the models generally in use in recent years, which guide policy advice and provide a framework for most academic macroeconomics, do none of these things, then the whole discipline needs to look inwards at its philosophical core, before it has any value in the guidance of public policy.

Minsky, Godley, and Keen all share sympathetic intellectual links to the modern money school, and I maintain that their work has the greatest value when interpreted in the context of modern monetary theory. The best mechanism to constrain Minskian fragility is for a monetary sovereign government to ensure private balance sheets carry enough nominally safe assets so that the development of the economy does not require increasingly fragile private financing. The best mechanism for offsetting shifts in foreign and private sectoral balance sheets, while maintaining full employment, is shifts in the fiscal balance. The best way of explaining to the economics profession, policy makers, and the general public the new economic framework that this implies is by using the institutional realism, stark language and metaphorical realism of modern monetary theory.

The framing of modern monetary theory, as I have already said, is of great significance, if a new macroeconomics is to have greater influence. An instability thwarting mechanism which has great promise, as a positive outcome of a new macroeconomics, and as an antidote to the fear of change and feelings of loss when apparently comforting but misleading metaphors are abandoned, is an effective job guarantee scheme.

Marx, Keynes, Kalecki, Minsky, and so many more, have identified one of the greatest weaknesses of modern capitalism to be its inability to achieve and maintain for more than a short period of time, tight full employment. Minsky and others have long called for a non-inflationary social mechanism to correct this flaw. Modern monetary theorists have refined Minsky's scheme, and clarified the mechanism by which it can be financed, and used to restrain inflationary pressures.

Now that I have discussed the limitations of orthodox neoclassical economics; sampled from the contributions of a few of the most significant heterodox economists; presented insights provided by modern behavioural economics; explored the realities of modern money; and recommended stock-flow consistent modelling as an alternative to the dominant general equilibrium approach to macroeconomic analysis, it is time to turn to the role of a job guarantee in the context of a policy program inspired by a new and 'hard' monetary approach to macroeconomics.

Appendix to Chapter Seven

Model 7A and Simulations

"I have found out what economics is; it is the science of confusing stocks with flows."

(Kalecki, c 1936, quoted in Godley and Lavoie 2006, p1)

The following is inspired by a well-known compact stock-flow consistent growth model, presented in a paper entitled *Kaleckian Models of Growth in a Coherent Stock-Flow Monetary Framework: A Kaldorian View* (Lavoie & Godley 2001).

The model presented here adds a government sector, profit making banks with a target capital adequacy ratio, household debt, capital asset depreciation, and trade and current account balances to the model in the above paper, which itself is a model of a closed economy without government.

However, the aim is to keep the model here almost as small and compact as the model which inspired it, so the rest of the world is not modelled (instead, the country is assumed to run a trade deficit, set as an arbitrary proportion of private sector spending); there is no inflation in this model (to abstract from the need to model inflation, and to distinguish between real and nominal values); and there are no changes in the level of inventories (production is assumed to equal demand in each time period). This avoids the extension of the model to well over

100 equations, as in chapter 11 of Godley and Lavoie (2006). In addition, this model does not include real estate, so that the only speculative asset in which household wealth can be held is equities.

The model consolidates the central bank into the government sector, which I have argued is for most purposes a useful thing to do, and includes only one form of government liabilities. These could be referred to as 'government money' or 'treasury bills'. I will refer to them as bills. Government net spending involves the emission of additional bills. These bills are held by the foreign sector and by the banking sector. The banking sector holds whatever 'bills' the government/central bank chooses to spend into existence which are not held by the foreign sector. In this sense, bills in this model are equivalent to exchange settlement balances, or federal funds, in the real world. The interest rate on bills is set by the government/central bank. This can be thought of as the official interest rate in this model.

By assumption, the rate of interest paid on bank deposits is equal to the rate of interest on bills. Households do not hold bills directly, and this is a cash free economy, so household wealth – excluding capital reserves tied up in banks - is divided up between bank deposits and equities. Banks do not issue equities, and can be interpreted as having the form of mutual organisations or private limited companies. Only households hold bank deposits, so that the business sector is assumed to spend financial resources, as it raises them, through retained earnings, new share issues and borrowing.

The correct accounting of the model is such as to make the demand for bank deposits by households equal to the supply of those deposits from the banking sector at every stage, without the need to include an equation in the model specifying that this is the case. This is Godley and Lavoie's quasi-Walrasian principle at work.

The balance sheet for the model is as follows:

Table 7A.1: Model 7A; Balance Sheet

	Households	**Firms**	**Banks**	**Govern-ment**	**Rest of World**	∑
Government Bills			*+Bb*	*-B*	*+Bo*	***0***
Bank Deposits	*+Dd*		*-Ds*			***0***
Bank Advances	*-Lh*	*-Lf*	*+L*			***0***
Equities	*+p.ed*	*-p.es*				***0***
Capital		*+K*				***+K***
Net Worth	***Dd+pe.ed-Lh***	***K-pe.es-Lf***	***Ls+Bb-Ds***	***-B***	***+Bo***	***+K***

Financial assets are positives and financial liabilities are negatives, with notation as follows.

B = net government sector liabilities at issue

B_b = net government liabilities held by banks

B_o = net government liabilities held by the overseas sector

D_d = bank deposits held by households

D_s = bank deposits created by banks

L = total advances by banks to firms and households

L_h = household debt

L_f = firm debt (where 'firms' refers to the non-financial business sector)

P_e = price per equity

e_s = equities issued

e_d = equities held by households

K = capital stock (real assets)

Household net worth is defined here to exclude bank reserves, so that the net assets of banks are recorded as bank net worth. The net worth of firms is the value of the capital stock, net of the market value of the firm's equities and their debt – this will be positive if the valuation ratio as defined below is less than 1, and negative if it is greater than 1, but has no direct significance in the model. There is no assumption that the stock market is informationally efficient, or that the valuation ratio will tend towards 1 over time. Government net worth is equal to the net emission of government liabilities. The rest of the world has a positive figure for net worth, equal to the negative net international investment position of this country, due to a history of net inflows on the capital and financial account, and consequent current account deficits.

Since every financial asset is also a financial liability, the net worth of the economy overall must be equal to the value of the capital stock, *K*. It would of course be better to incorporate ecological resources into the real resources which constitute the wealth and productive capacity of the economy, but that is not the purpose of this particular model.

Having run the model for enough years to generate interesting values, but insufficient years for all variables to reach quasi-steady states where key ratios are constant, the balance sheet of the economy in the 'year 2000' is as follows:

Table 7A.2: Model 7A; Balance Sheet; 'Year 2000' Values

Balance Sheet, 'Year 2000'	**Households**	**Firms**	**Banks**	**Govern-ment**	**Rest of World**	∑
Government Bills			*-1600.9*	*-6031.43*	*7632.33*	***0***
Bank Deposits	*14466.57*		*-14466.57*			***0***
Bank Advances	*-8484.57*	*-10292.07*	*18776.64*			***0***
Equities	*10829.07*	*-10829.07*				***0***
Capital		*37691*				***37691***
Net Worth	***16811.07***	***16569.86***	***2709.17***	***-6031.43***	***7632.33***	***37691***

At this stage, government financial liabilities are not great enough to match the net portfolio demand on the part of the rest of the world for the financial liabilities of this economy, and

consequently the private sector has net financial liabilities overall, and the banking sector has a negative for its net holdings of bills. This means the government/central bank is net lending to the banking sector, so that the banks are running overdrafts with the government/central bank.

The general form for the transactions matrix is as follows:

Table 7A.3: Model 7A; Transactions Matrix

	Households	**Firms**		**Banks**		**Govern-ment**	**Rest of World**	∑
		Current	**Capital**	**Current**	**Capital**			
Consumption	$-C$	$+C$						***0.0***
Investment		$+I$	$-I$					***0.0***
Pure Government Spending		$+G$				$-G$		***0.0***
Net Exports		$+NX$					$-NX$	***0.0***
Wages	$+WB$	$-WB$						***0.0***
Net Profits	$+FD$	$-F$	$-FU$					***0.0***
Bank earnings	$+FDB$			$-FB$	$+\Delta R$			***0.0***
Taxation	$-T$					$+T$		***0.0***
Interest on Advances	$-rl_{-1}.Lh_{-1}$	$-rl_{-1}.Lf_{-1}$		$+rl_{-1}.L_{-1}$				***0.0***
Interest on Deposits	$+r_{-1}.D_{-1}$			$-r_{-1}.D_{-1}$				***0.0***
Interest on Govt Net Liabilities				$+r_{-1}.Bb_{-1}$		$-r_{-1}.B_{-1}$	$+r_{-1}.Bo_{-1}$	***0.0***
Δ Loans	$+\Delta Lh$		$+\Delta Lf$		$-\Delta L$			***0.0***
Δ Bank Deposits	$-\Delta D$				$+\Delta D$			***0.0***
Δ Government Net Liabilities					$-\Delta Bb$	$+\Delta B$	$-\Delta Bo$	***0.0***
Δ Equities at Issue	$-p_e \Delta e$		$+p_e \Delta e$					***0.0***
∑	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***

Net sources of funds are positives, and net uses are negatives. Every row must sum to zero, since every $1 of funds available for use have come from somewhere in the system. For example, in the first row, the consumer spending which is a source of funds for firms is a use of funds for households.

Every column must sum to zero, since each $1 available for use in a sector has been used to make payments or acquire assets. For example, households have available for use their wages (*WB*), plus dividends from firms (*FD*) and banks (*FDB*), plus interest received on deposits $(r_{-1}.D_{-1n})$, plus new borrowing from banks (ΔLh). They use these funds to pay taxes (*T*), for consumption (*C*), to pay interest on their existing loans from banks $(rl_{-1}.Lh_{-1})$, to acquire new equities $(p_e \Delta e)$ or (as a residual) to acquire additional bank deposits(ΔD).

It is convenient here to separate out current and capital decisions, for both firms and banks. In the case of banks, this allows for us to distinguish between the determinants of bank profits, and the division of those profits between additions to capital reserves and dividend payments to households, who own the banks. Bank earnings (*FB*) are used as a source of capital reserves towards a target for the capital to asset ratio (ΔR), and the rest are paid out in bank dividends to households (*FDB*).

The transactions matrix of the model in the 'year 2000' is:

Table 7A.4: Model 7A; Balance Sheet; 'Year 2000' Values

Transactions Matrix, Yr. 2000	**Households**	**Firms**		**Banks**		**Govern-ment**	**Rest of World**	∑
		Current	**Capital**	**Current**	**Capital**			
Consumption	*-7408.46*	*7408.46*						***0.0***
Investment		*2712.40*	*-2712.40*					***0.0***
Pure Government Spending		*1662.76*				*-1662.76*		***0.0***
Net Exports		*-202.42*					*202.42*	***0.0***
Wages	*7018.91*	*-7018.91*						***0.0***
Net Profits	*1999.35*	*-4166.33*	*2166.98*					***0.0***
Bank earnings	*309.09*			*-413.31*	*104.22*			***0.0***
Taxation	*-1464.11*					*1464.11*		***0.0***
Interest on Advances	*-326.48*	*-395.96*		*722.44*				***0.0***
Interest on Deposits	*277.81*			*-277.81*				***0.0***
Interest on Govt Net Liabilities				*-31.32*		*-114.36*	*145.68*	***0.0***
Δ Loans	*322.52*		*392.99*		*-715.51*			***0.0***
Δ Bank Deposits	*-576.20*				*576.20*			***0.0***
Δ Government Net Liabilities					*35.09*	*313.01*	*-348.10*	***0.0***
Δ Equities at Issue	*-152.43*		*152.43*					***0.0***
∑	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***

Since banks are currently in debt to the government/central bank, payments of interest from the government to the banks are shown as -31.32. This of course means that in 'year 2000' the banks are paying interest to the government sector.

The equations of the model are as follows:

We start with the national income accounting identity for GDP.

$$Y = C + I + G + NX \quad (7A.1)$$

Non-financial sector firm profits before interest (*EBIT*) are given by (7A.2)

$$EBIT = \frac{\mu}{1-\mu} * Y \quad (7.A2)$$

The parameter μ is Kalecki's gross mark-up over direct costs, which in this model are entirely labour costs.

$$WB = Y - EBIT \quad (7A.3)$$

The wage bill is that part of GDP which is not *EBIT*, so that *Y = EBIT + WB*. Banking sector services do not directly make up a part of GDP in this model, and bank earnings are instead treated as a transfer, and a use to which a part of GDP is put.

$$NX = -\psi.(C + I) \qquad (7A.4)$$

This country is assumed to be running a trade and current account deficit, since the country is in receipt of net capital inflows, driving the real exchange rate to a level at which the trade balance is in deficit. Given the dominance of financial flows in the determination of floating exchange rates in the modern world – where the turnover of the foreign exchange market in recent times has been approximately 100 times the value of trade flows (BIS 2013) – the capital and financial account is viewed as the primary cause of the trade balance being in deficit. In the model, the trade deficit is a proportion of private sector spending, where the proportion is a parameter. This assumption is made to keep the model compact.

$$I = \delta.K_{-1} + g_k K_{-1} \qquad (7A.5)$$

Gross investment spending is the sum of replacement investment and net investment. Replacement investment is a fixed proportion of the previous period's value of the capital stock, where that proportion δ is a parameter. Net investment is again a proportion of the

prior capital stock, but the rate of accumulation coefficient g_k is given by an equation, similar to the Kalecki-Steindl-Keynes-Minsky equation used in Lavoie and Godley.

$$g_k = a_0 + a_1(u_{-1} - u^*) + a_2 \left(\frac{FU_{-1}}{K_{-1}}\right) + a_3(q_{-1} - q^*) \quad (7A.6)$$

I have omitted the rate of interest on loans from the equation used by Lavoie and Godley, although of course the rate of interest will still influence the rate of accumulation, though its direct impact earnings net of interest, and through its impact on the propensity to consume and on household wealth.

u_{-1} is to the utilisation ratio of the previous period.

$$u = {}^{Y}/_{Y_{cap}} \quad (7A.7)$$

$$Y_{cap} = {}^{K_{-1}}/_{COR} \quad (7A.8)$$

a_0, a_1, a_2 and a_3 are all parameters in the model, as is the capital output ratio, COR.

q_{-1} is the valuation ratio for the previous period.

$$q = \frac{p_e . e}{K - L_f} \qquad (7A.9)$$

The higher the utilisation ratio and the stock-market valuation ratio, the higher the rate of capital accumulation. Though a utilisation ratio of 70% and valuation ratio of 100% are included in the equation, this does not mean there is any tendency in the model towards a steady state at either (or both) of these benchmarks.

The consumption function is as follows:

$$C = \alpha_1 Y_{r\,-1}(1 - \theta) + \alpha_1 \Delta L_{h-1} + \alpha_2 V_{-1} - \alpha_1 r_{l-1} L_{h-1} \qquad (7A.10)$$

Household consumption depends on the previous period's after-tax regular income, on the net additional loans household took out last period, on household wealth in the previous period, and on the interest households have to pay on their existing debts. Consumption perhaps ought to depend on expected values of regular income and wealth this period, but it is in the nature of these models that such a change does not make a significant different to the operation of the model over time.

The marginal propensity to consume out of regular income depends on the lagged rate of interest on loans, as in model PCEX2:

$$\alpha_1 = \alpha_{10} + \alpha_{11} r_{l-1} \quad (7A.11)$$

Gross regular income includes wage income, interest received on deposits, dividends from firms, and dividends from banks:

$$Y_r = WB + r_{-1}.D_{-1} + FD + FDB \quad (7A.12)$$

Household wealth (V) is the net worth of households, excluding bank reserves, and as identified in the balance sheet matrix:

$$V = D + p_e e - L_h \quad (7A.13)$$

The rate of interest on loans is given by adding a bank profit margin onto the rate of interest on deposits (which by assumption is set at the rate of interest on bills here).

$$r_l = r + \pi_b \tag{7A.14}$$

The official interest rate, or rate of interest on bills, is set at 2% in the base case, with a bank profit margin of 2%.

The amount of new household borrowing ΔL_h is assumed to depend on another measure of income – Haig-Simons income, Y_{hs} ,

$$Y_{hs} = Y_r\,(1-\theta) + CG\left(1-\frac{\theta}{2}\right) - r_{l-1}L_{h-1} \tag{7A.15}$$

CG denotes capital gains on shares, which are the only speculative asset in this model:

$$CG = \Delta p_{\mathrm{e}}.\,e_{-1} \tag{7A.16}$$

It is assumed that all capital gains are taxed, whether realised or not, but that they are taxed at a concessional rate of half the marginal tax rate on regular income. New household borrowing is then given as a proportion of any increase in Haig-Simons income over the period:

$$\Delta L_h = \zeta\,(\,Y_{hs} - Y_{hs-1}) \tag{7A.17}$$

$\alpha_{10}, \alpha_{11}, \alpha_{2,}\, \theta, \pi_b$and ζ are further values which need to be selected. θ is of course a key policy variable.

The distributed profits of firms are a proportion of the entrepreneurial earnings F of the previous period, which are themselves EBIT net of interest payments to banks, given that there are no taxes on corporate profit in this model. That proportion is the dividend pay-out ratio (POR), which is a further parameter:

$$F = \ EBIT - r_{l-1} L_{f-1} \tag{7A.18}$$

$$FD = POR.\, F_{-1} \tag{7A.19}$$

Retained earnings are given as a residual by,

$$FU = F - \ FD \tag{7A.20}$$

The proportion of planned investment to be funded through the issue of new shares depends on the lagged valuation ratio, so that the number of new shares issued in each period is given by,

$$\Delta e_s = \frac{\gamma q_{-1} I}{p_{e-1}} \qquad (7A.21)$$

The remaining source of funding for investment is additional borrowing by firms from the banking sector:

$$\Delta L_f = I - FU - p_{e-1}\Delta e \qquad (7A.22)$$

The only market clearing price in the model is the price of an equity share. This is set by equating the supply of shares from 7A.21 with the demand for shares, to determine p. The proportion of the previous period's household wealth which is invested into the share market in this period is given by an equation similar to the Tobin 'pitfalls equation' used in Lavoie and Godley, except for the omission of a term relating to the transactions demand for money.

Rearranging the resulting equation for the household demand for shares to make the market clearing price of shares the subject, we get,

$$p_{\mathrm{e}} = \{\lambda_0 - \lambda_1 r_{-1} + \lambda_2 r_{e-1}\} V_{-1}/_{e} \qquad (7A.23)$$

Household demand for shares, and therefore the market-clearing price of shares, since the supply this period has already been determined, depends negatively on the lagged return on bank deposits and positively on the lagged return on equities. The λ_i terms are further parameters.

The return on equities is the simple sum of the dividend yield plus capital gain. In gross terms, this gives us,

$$r_e = \frac{FD+CG}{p_{-1}e_{-1}} \qquad (7A.24)^*$$

(* in the simulation model as used, FD was adjusted using the marginal income tax rate and CG using the concessional tax rate for capital gains)

It is government spending which drives the sustainable rate of growth of demand in this model, and consequently which drives the growth in GDP. Pure government spending, net of interest payments on government financial liabilities, is taken to grow at some trend rate:

$$G = G_{-1}(1 + g_g) \quad (7A.25)$$

The growth rate in pure government spending, is another parameter, which will be set at 4% in the base case of the model.

Taxation is given by,

$$T = \theta(Y_r) + \left(\theta/_2\right)CG \quad (7A.26)$$

The fiscal deficit is given by,

$$\Delta B = T - G - r_{-1}B_{-1} \quad (7A.27)$$

Part of this reflects a demand for domestic financial assets on the part of the rest of the world, due to the current account deficit:

$$\Delta B_o = -(CA) = -(TB) + r_{-1}B_{o-1} \quad (7A.28)$$

The rest is taken up by domestic banks. Government financial liabilities in this context equate to additional exchange settlement reserves or federal funds for the banking sector, so that there is no question of securities needing to be sold in a market to 'fund' the fiscal deficit. Banks must take up as settlement reserves whatever government financial liabilities are not taken up by other sectors, as in real life (in this model, the only other sector to hold government liabilities directly is the overseas sector). Should insufficient net government liabilities be issued to meet the demand for them from the foreign sector, then banks go short in bills in this model, which equates to central bank lending to the banks at the official interest rate:

$$\Delta B_b = \Delta B - \Delta B_o \qquad (7A.29)$$

Distributed earnings from banks are given by bank earnings, less bank retained earnings:

$$FDB = FB - \Delta R \qquad (7A.30)$$

Bank earnings are given by the gap between interest received on assets and interest paid on liabilities:

$$FB = r_{l-1}L_{f-1} + r_{l-1}L_{h-1} + r_{-1}B_{b-1} - r_{-1}D_{-1} \qquad (7A.31)$$

Bank retained earnings depend on the necessary increase in reserves to meet a lagged solvency ratio requirement, where *SOLR* is the required solvency ratio:

$$\Delta R = (SOLR - SOL).\left(L_{f-1} + L_{h-1}\right) \quad (7A.32)$$

The demand for deposits at banks is determined from the balance sheet of households as,

$$D_d = V + L_h - p.e_d \quad (7A.33)$$

The supply of deposits by banks comes from the balance sheet of banks, and is,

$$D_s = L + B_b - R \quad (7A.34)$$

The equation I have no need to write down is the identity between the demand for deposits on the part of households, and their supply by banks ($D_d = D_s$). As stated above, this identity is a consequence of correct accounting within the model, and serves as a check that the model is correctly specified in terms of accounting for stock-flow relationships.

This is sufficient to determine the behaviour of this highly simplified, mechanical and non-stochastic monetary model. As I have stated, it has obvious limitations, but any attempt at a fully realistic model of this kind necessitates at least three times as many equations, and full realism is not the purpose here. The purpose is to design an excel model with some institutional realism, which accounts correctly for stocks and flows, within which a range of useful experiments can be carried out. The experiments are useful if they generate predictions which still hold approximately in much larger and more realistic models, and which are likely to apply in real life also, since they reflect the workings of a correct accounting for stocks and flows within the model.

Since the price level is held constant (at P=1.65), then any changes in labour productivity (APL) or the Kaleckian mark-up show up as changes in the (real) wage:

$$\frac{W}{P} = \frac{APL}{(1+\mu)} \qquad (7A.32)$$

Labour productivity is set at 1, the mark-up is 0.65, and therefore the nominal wage rate W is 1, in the base case.

Employment is given by the wage bill divided by the wage rate:

$$N = \frac{WB}{W} \quad (7A.33)$$

The labour force grows over time, at some trend rate:

$$LF = LF_{-1}(1 + g_{LF}) \quad (7A.34)$$

In the base case, pure government spending grows in line with the sum of the growth rate of the labour force and the growth of labour productivity, with the growth in labour productivity set equal to zero.

The unemployment rate is given by 1 – the ratio of employment to the labour force:

$$UN = 1 - \frac{N}{LF} \quad (7A.35)$$

In the 'year 2000', the labour force consists of 7,233 workers, and the unemployment rate is 2.96%.

The behaviour of key economic aggregates within the model, given the set of parameter values used for the base case and the year 2000 data in the above balance sheet and transactions matrix, is partially described in the following twelve charts:

Figure 7A.1: Nominal GDP. Model 7A - Base Case; 2000-60

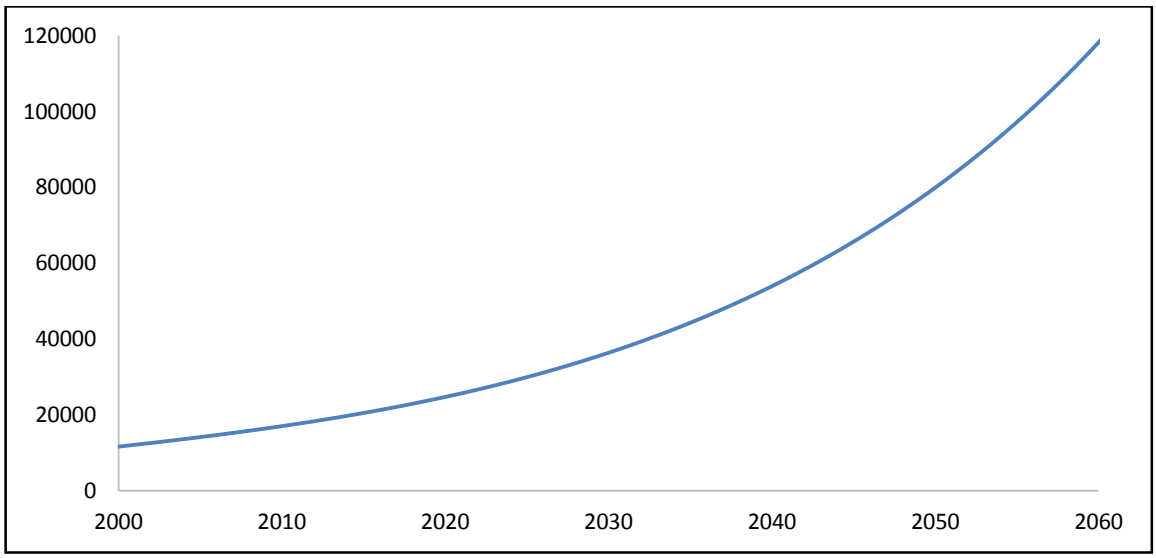


Figure 7A.2: Unemployment Rate. Model 7A - Base Case; 2000-60

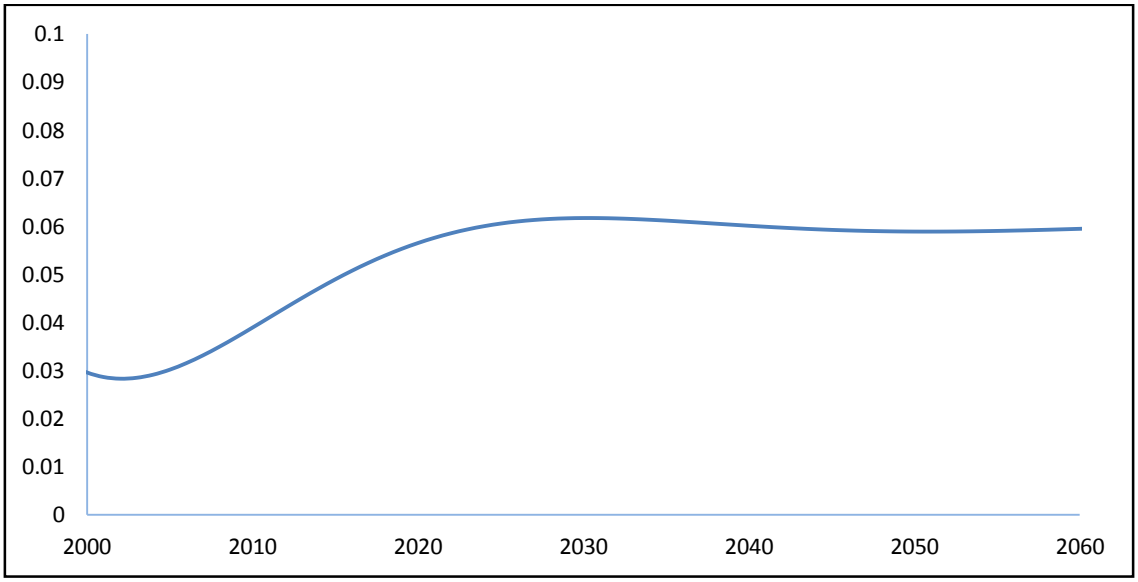


Figure 7A.3: Real GDP Growth Rate. Model 7A - Base Case; 2000-60

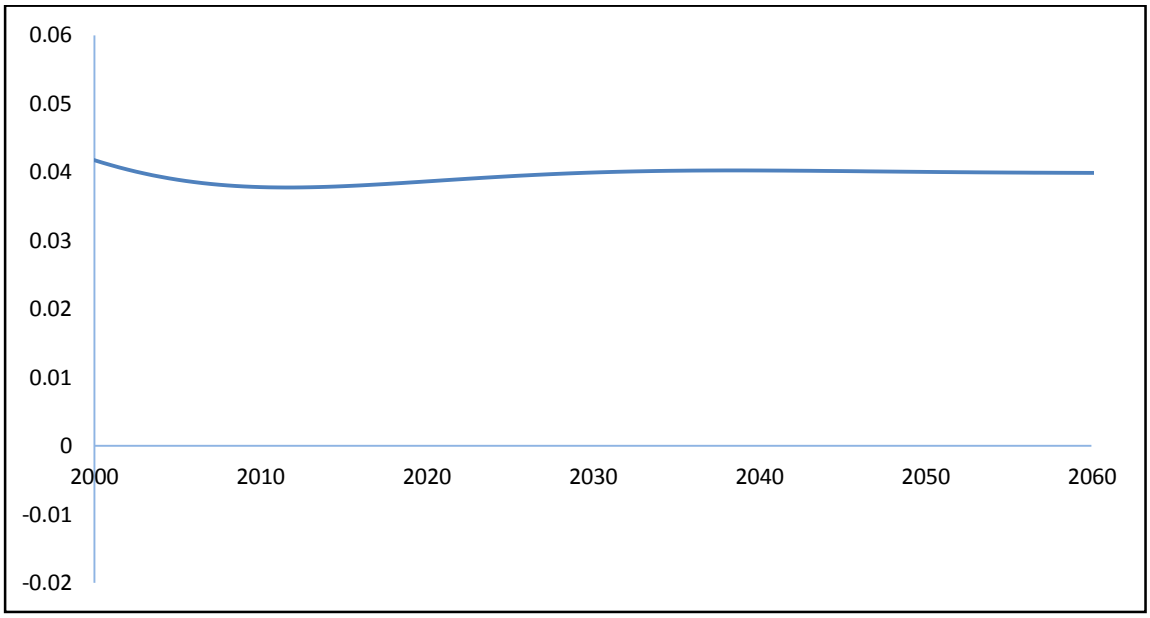


Figure 7A.4: Primary and Fiscal Balances to GDP. Model 7A- Base Case; 2000-60

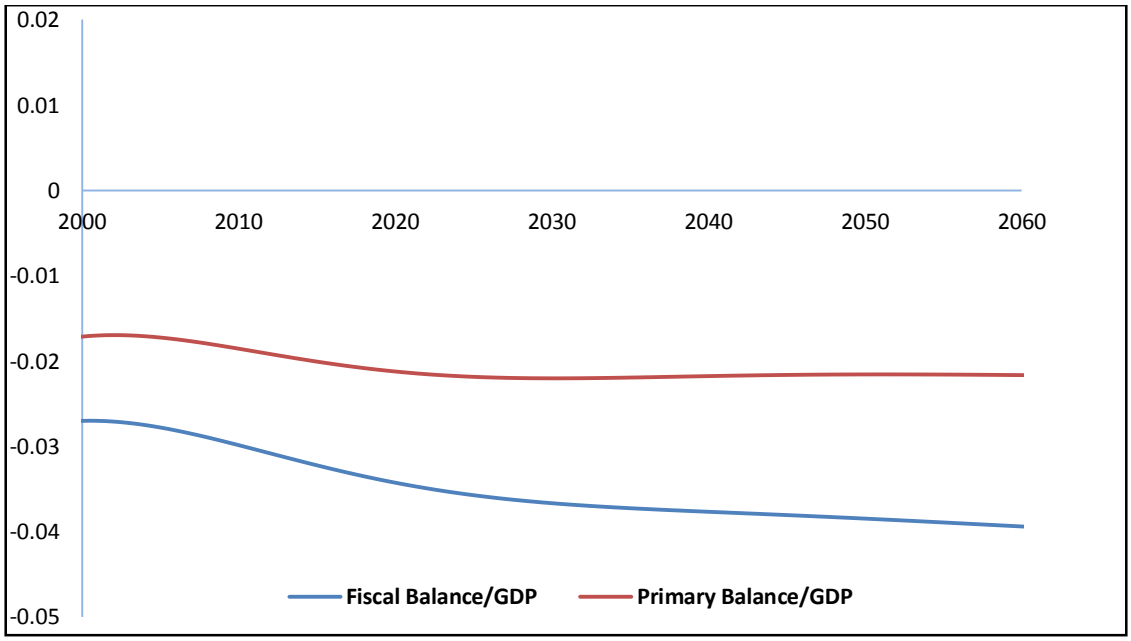


Figure 7A.5: Domestic Expenditure Shares in GDP. Model 7A - Base Case; 2000-60

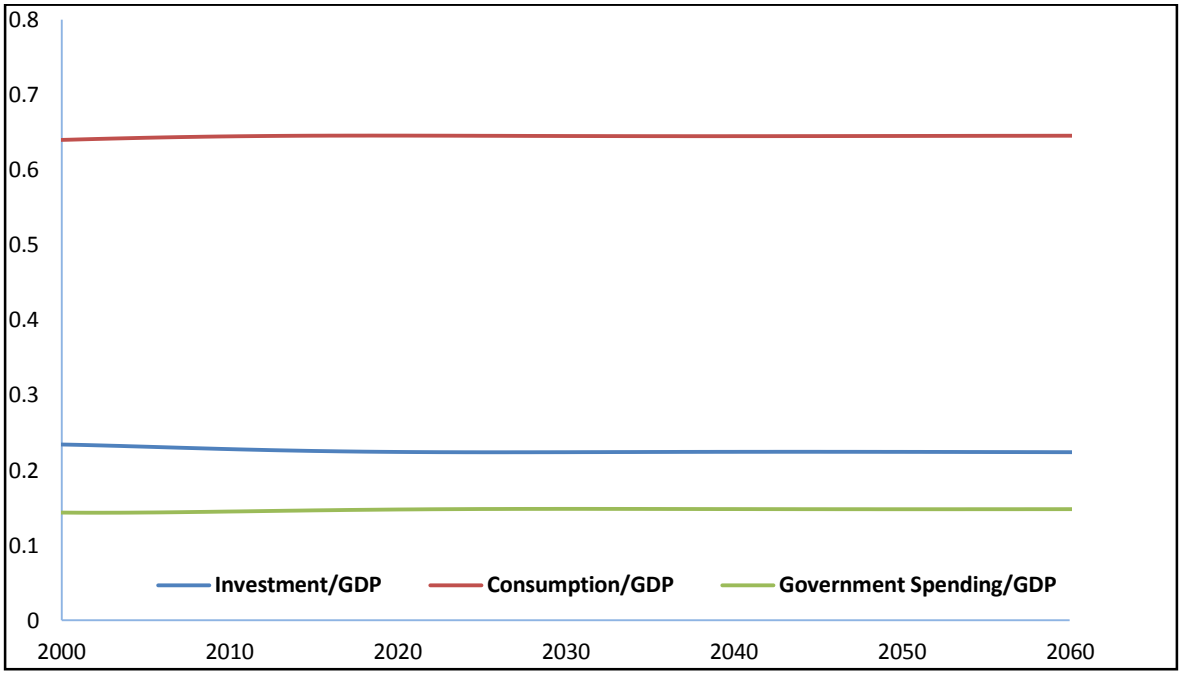


Figure 7A.6: 3-Sector Financial Balances to GDP. Model 7A -Base Case; 2000-60

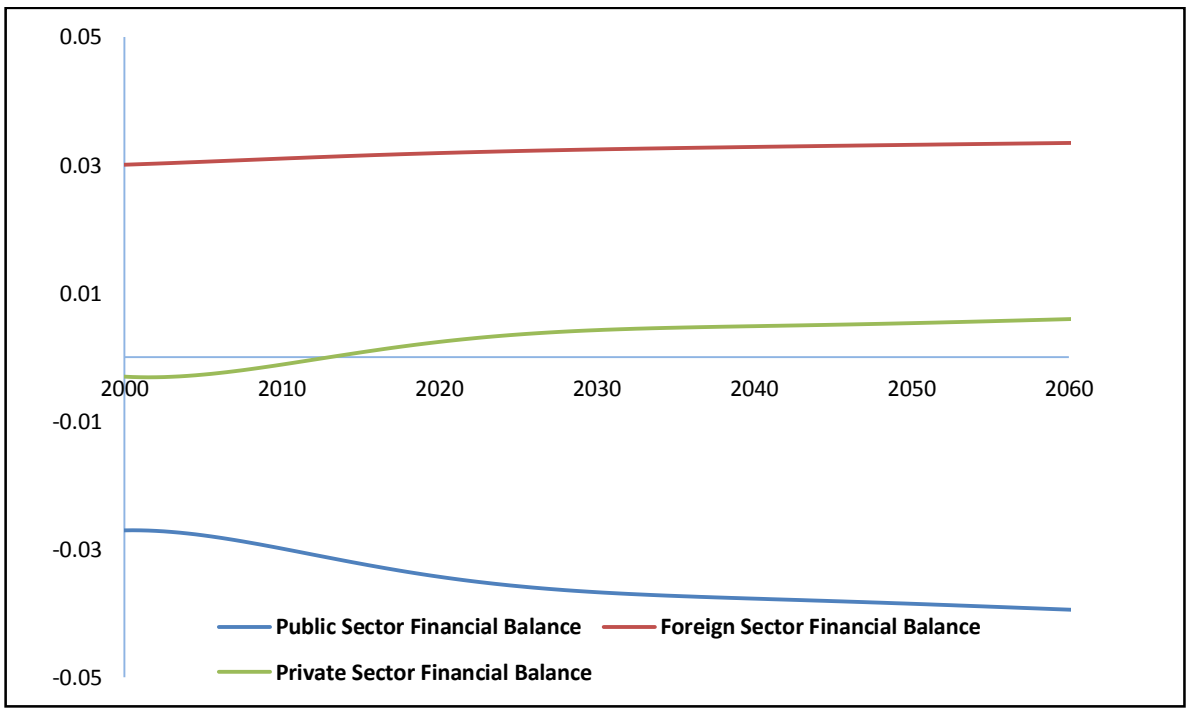


Figure 7A.7: 3-Sector Financial Balances to GDP. Model 7A - Base Case; 2000-60

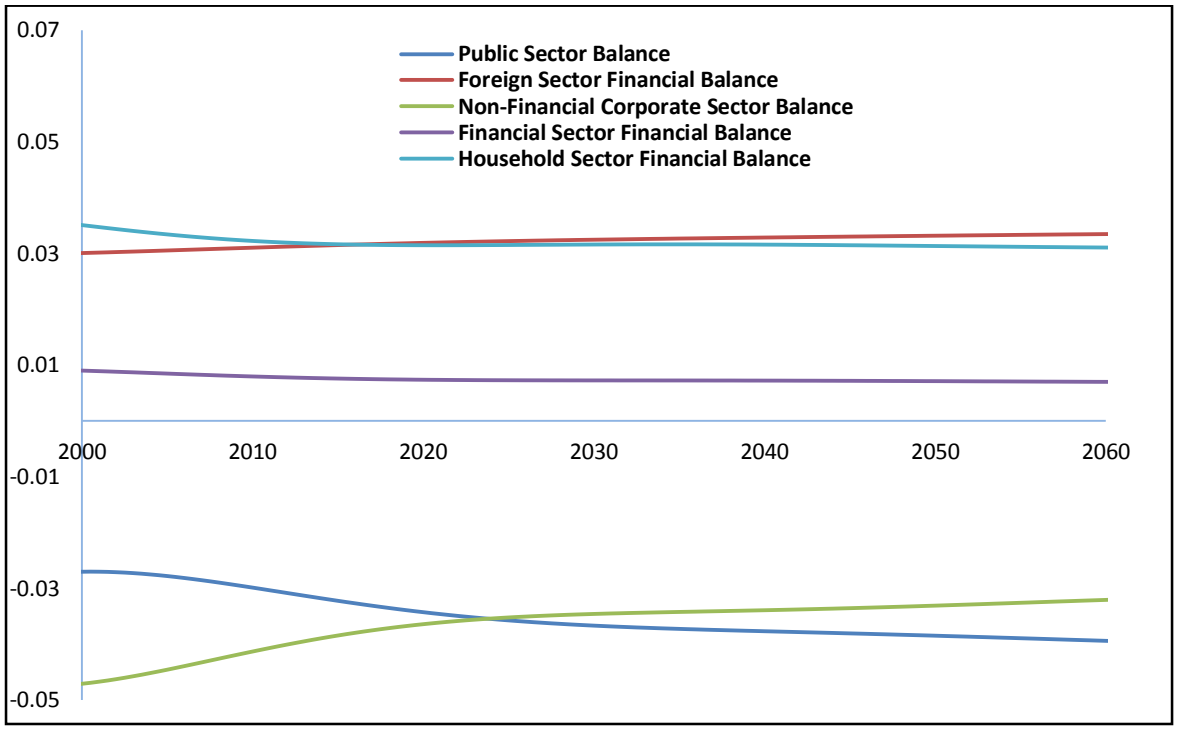


Figure 7A.8: Government 'Debt' Ratio. Model 7A- Base Case; 2000-60

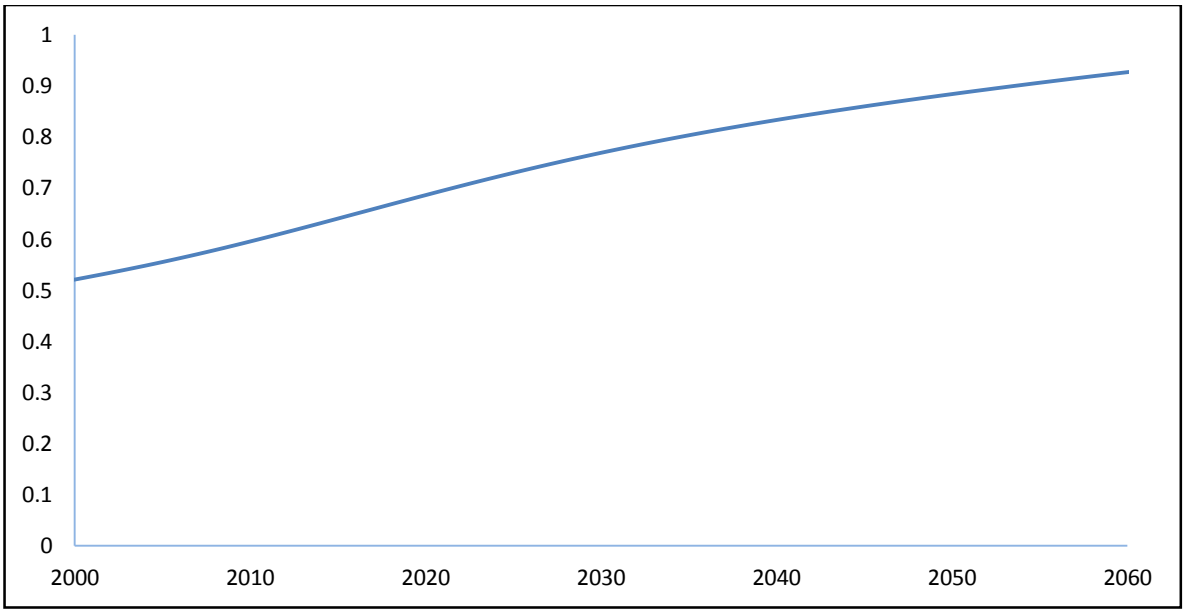


Figure 7A.9: External Debt Ratio. Model 7A - Base Case; 2000-60

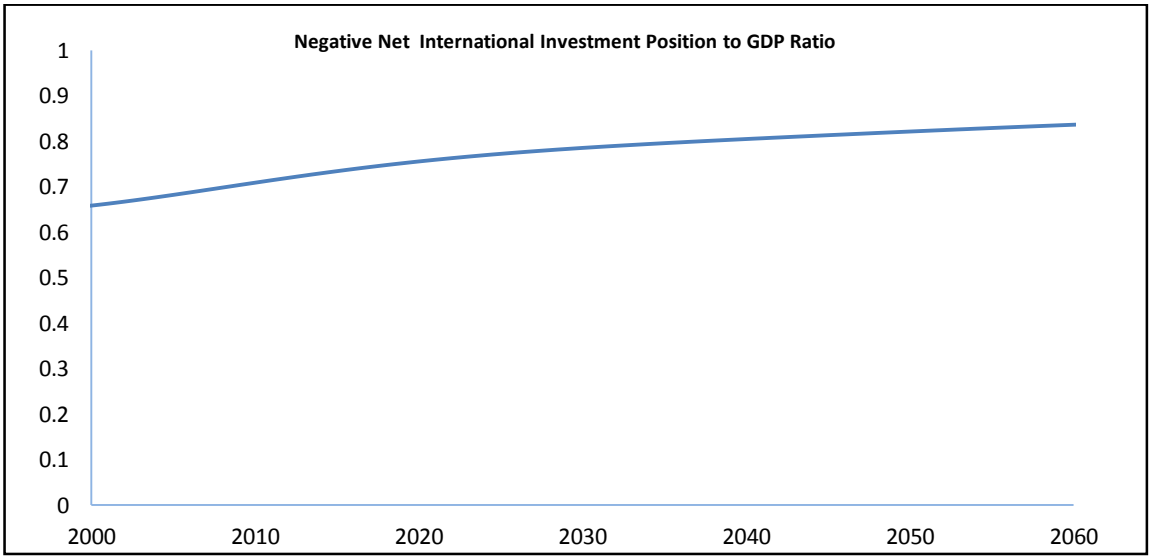


Figure 7A.10: Wage Share in GDP. Model 7A - Base Case; 2000-60

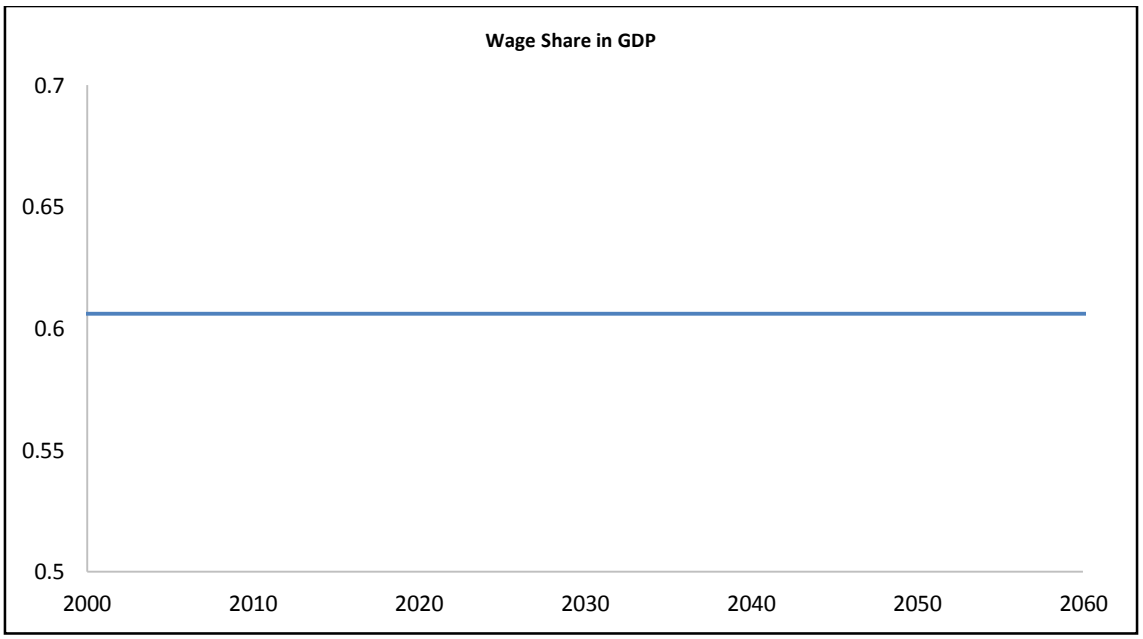


Figure 7A.11: Household Debt Ratio. Model 7A - Base Case; 2000-60

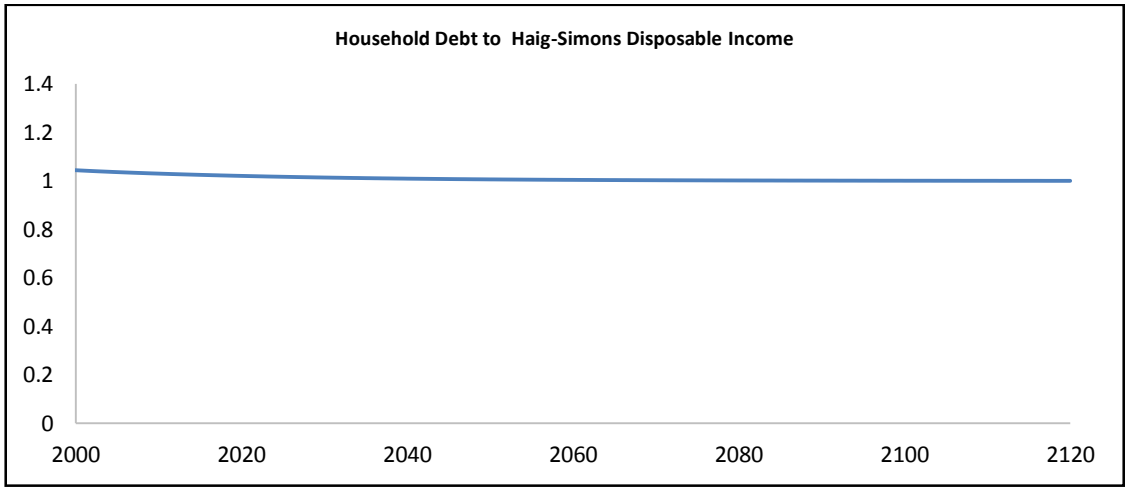


Figure 7A.12: Price Level and Wage Rate. Model 7A - Base Case; 2000-60

The economy in this simple model of course looks like a very stable place, and as it stands there is no financial instability in this model, but Minskian financial instability; complexity and non-linearities; and stochastic behaviour can easily be added. A model like this, and even far more complicated and realistic stock-flow consistent models, provide a canvas on which a variety of scenarios can be described. While almost fully realistic models, with parameters selected for consistency with econometric data, can be used as an aid to economic forecasting, that is not the most important function of these models. They can, at best, as Godley understood, make contingent predictions of possible future outcomes. The power of such models lies in their narrowing down the set of possible futures, to ones consistent with a plausible evolution of stocks and flows, based on correct accounting.

Bearing that in mind, it is time to return to the simulation conducted in chapter 7, using the even simpler and static PCEX2 model. A one-off cut to planned pure government spending is carried out in 2020, matched with a reduction in the official interest rate easily large enough to initially offset the impact of the fiscal tightening on GDP.

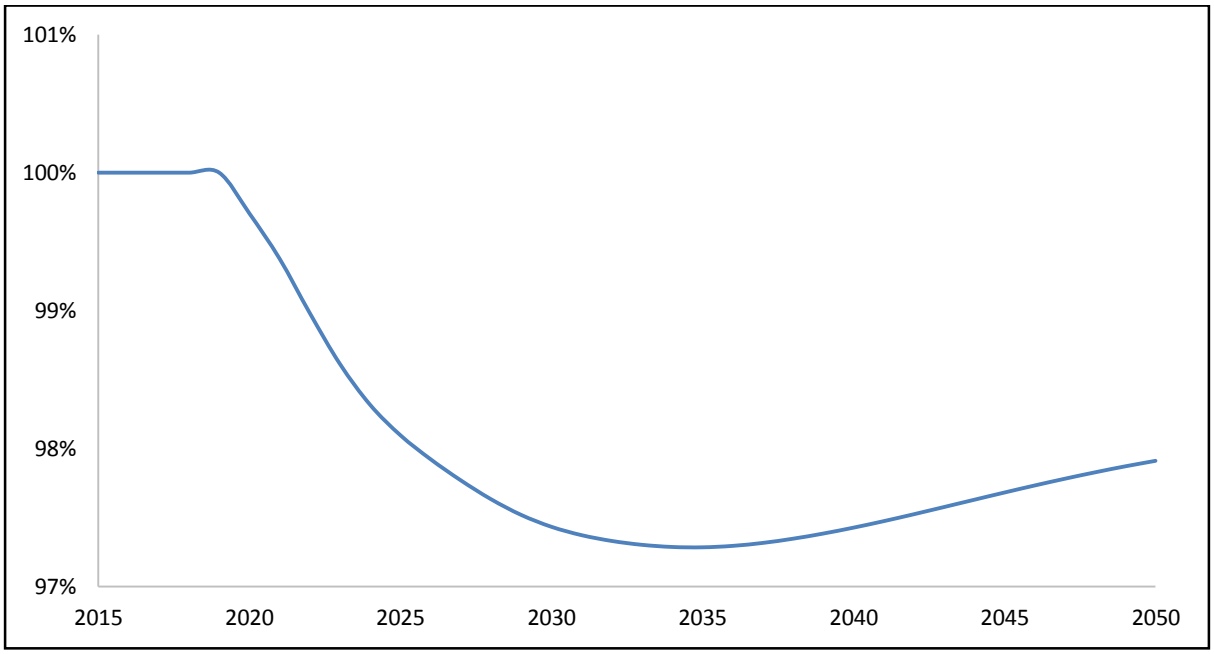
The simulation model is set up to provide the most optimistic initial results from cutting interest rates, with external debt in 2000 greater than government net financial liabilities, with the balance made up for by the domestic private sector being in debt to the government. This means that, initially at least, a cut in interest rates not only raises the marginal propensity to consume out of income (as in PCEX2), but also reduces interest payments being made by

domestic banks to the government, and reduces interest payments being made by the government to the rest of the world.

A cut in government spending in 2020, relative to what had been planned, of 2%, does not require a reduction in pure government spending at all. Instead, given an assumed trend increase in government spending of 4% per annum, it means that in 2020, spending is increased by just under 2%. This is of course not 2% of GDP – it is slightly below 0.3% of GDP in the model.

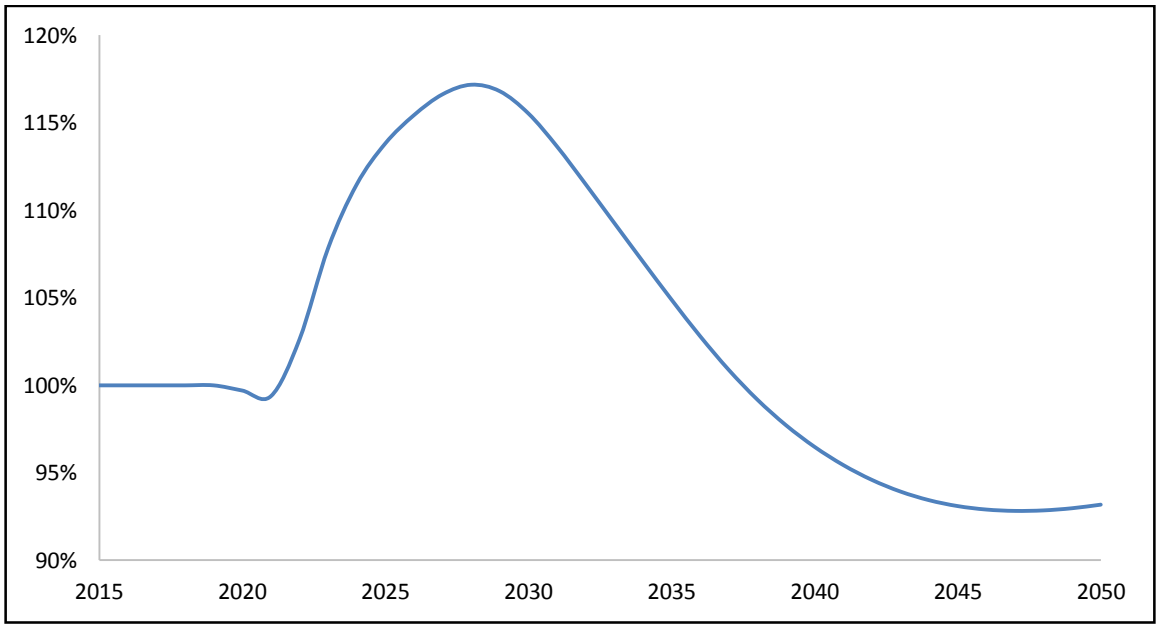
The impact of the (single year only) reduction in the rate of growth of pure government spending is as follows:

Figure 7A.13: One-Off Reduction in Rate of Growth of G from 4% to 1.92% in 2020. Model 7A - Impact on GDP relative to Base Case; 2015-50



Suppose the authorities combine this fiscal tightening with a large monetary stimulus, adopting a permanent zero interest rate policy in 2020, in a loose monetary/tighter fiscal policy mix. An apparently mild fiscal tightening (government spending is after all still rising) and a drop in the official interest rate all the way to zero, might be expected to have significant and persistent positive effects on GDP.

Figure 7A.14: One-Off Reduction in Rate of Growth of G from 4% to 1.92% in 2020, combined with a permanent cut in the 'Cash Rate' from 2% to 0%. Model 7A - Impact on GDP relative to Base Case; 2015-50

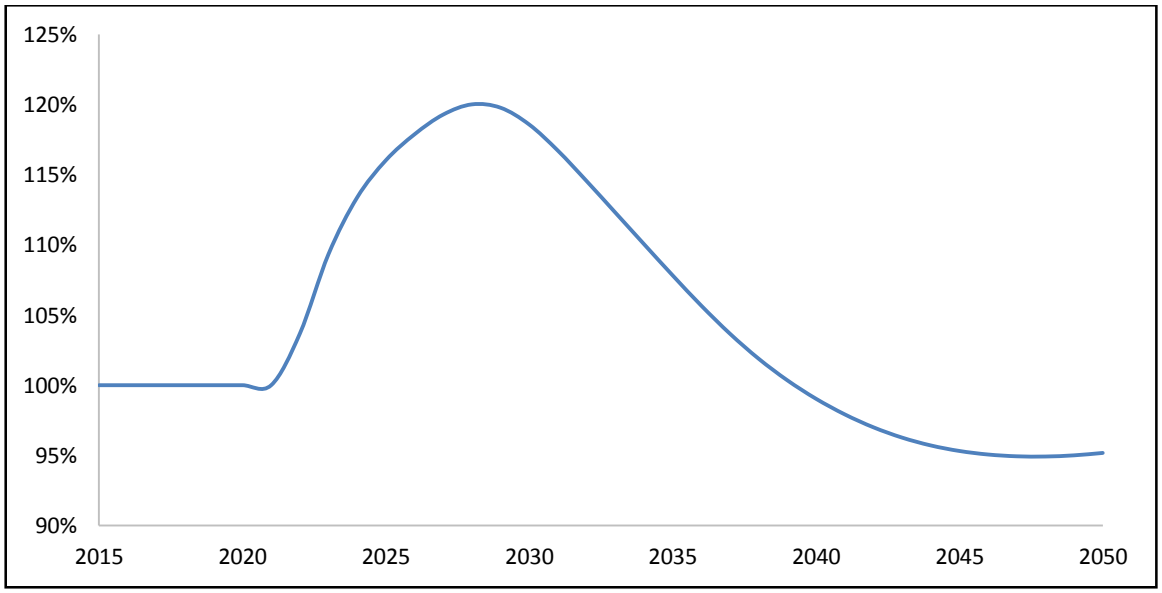


It is unsurprising that, given the circumstances of the model in 2020, this policy mix appears to have a significant stimulative impact on demand and GDP over the subsequent decade or so. However, even with government debt held entirely by the rest of the world in 2020; even with commercial banks in debt to the central bank; and even with parameters selected so that this cut in interest rates has a major impact on the marginal propensity to consume out of income (raising it from 0.74 to 0.82); the positive impact of the policy mix on demand is temporary. Before 20 years have gone by in the model, the net impact has been reversed and has become significantly negative. This would have happened much sooner if the model base case had in 2020 had the government being in debt to the domestic private sector, rather than the other way around. That is happens at all is here, as it was in PCEX2, due to the rising propensity to consume out of income eventually reducing household wealth.

The significant point is that even when a stock-flow consistent model is set up to provide the most favourable possible circumstances for a reduction in interest rates, or other purely monetary policy mechanism such as deregulating credit, to stimulate growth in aggregate demand relative to trend, any such effect is temporary. The introduction of speculative bubbles, and growing Minskian instability in the accumulation of private debt, can extend the period of the stimulus, but not permanently, and at the cost of a subsequent crash.

To emphasize the point, we might consider the impact of the zero interest rate policy plus the fiscal contraction, relative to the fiscal contraction alone:

Figure 7A.15: ZIRP versus No-ZIRP; 2015-50



Monetary policy cannot deliver a permanently higher level of aggregate demand, and therefore of output and employment in an economy with an output gap. It can at best have a temporary impact, and that impact is at the potential cost of growing financial instability and speculative bubbles in asset markets. Since the economy is a modern monetary system, and not a Barro-Ricardian one, an appropriate use of fiscal policy and the emission of net financial liabilities by monetary sovereign governments which cannot become insolvent in their own currencies, is key to non-inflationary full employment.

Unemployment in 2020 in the base case is 5.7%, and the slow evolution of unemployment towards a steady state of about 6.25% is shown in Figure 7A2. Suppose that the government wishes to reduce the unemployment rate to below 2% and hold it there. Suppose that to do this the government uses a simple fiscal rule, which is to multiply the trend rate of growth of pure government spending each year by {1+ (U_{-1}- 0.01)}, where U is the unemployment rate, starting in 2021.

More generally, the fiscal rule could be written as

$$G = G_{-1}\left(1 + g_g[1 + \omega(U_{-1} - U^*)]\right) \qquad (7A.36)$$

where $\omega \; and \; U^*$ have been set at 1 and 0.01 respectively in this simulation.

In the model, the fiscal rule gradually and slowly reduces the unemployment rate towards the desired level. It does so by mildly increasing the rate of growth of GDP above the rate of

growth of the labour force (and productivity growth) until the unemployment rate has been brought down.

There are no significant implications for the government debt ratio.

Figure 7A.16: A Mild Fiscal Rule for Eventual Full Employment; 2015-50

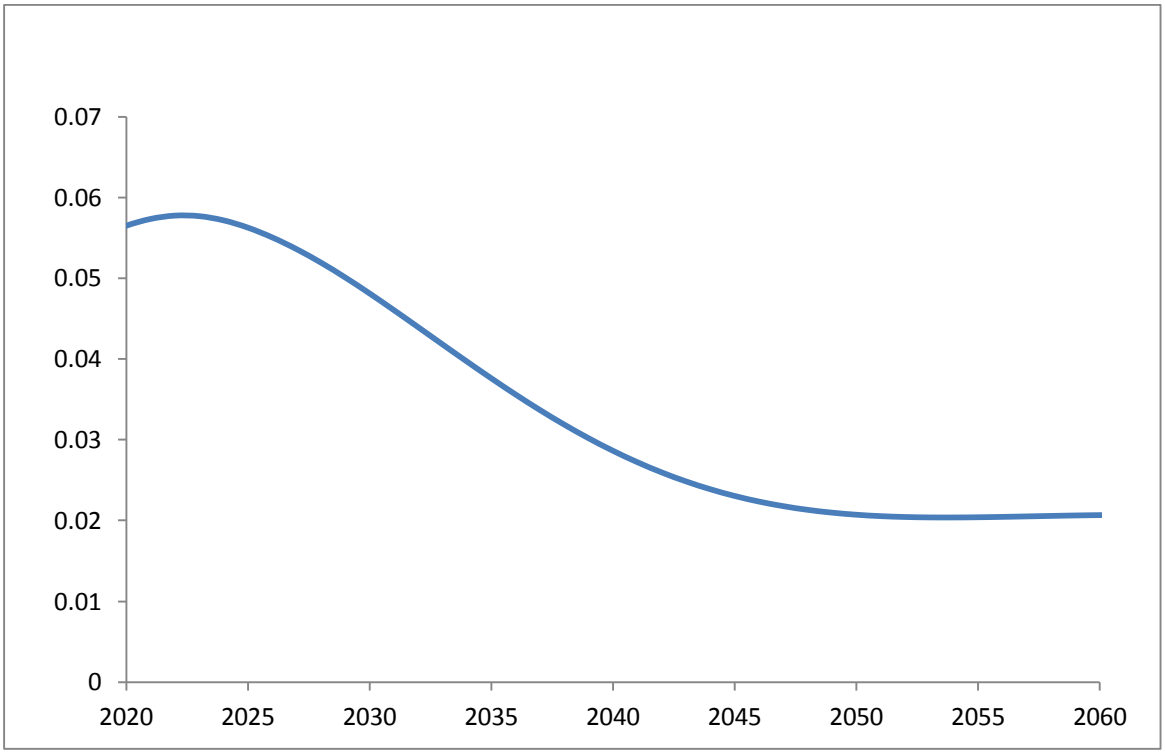
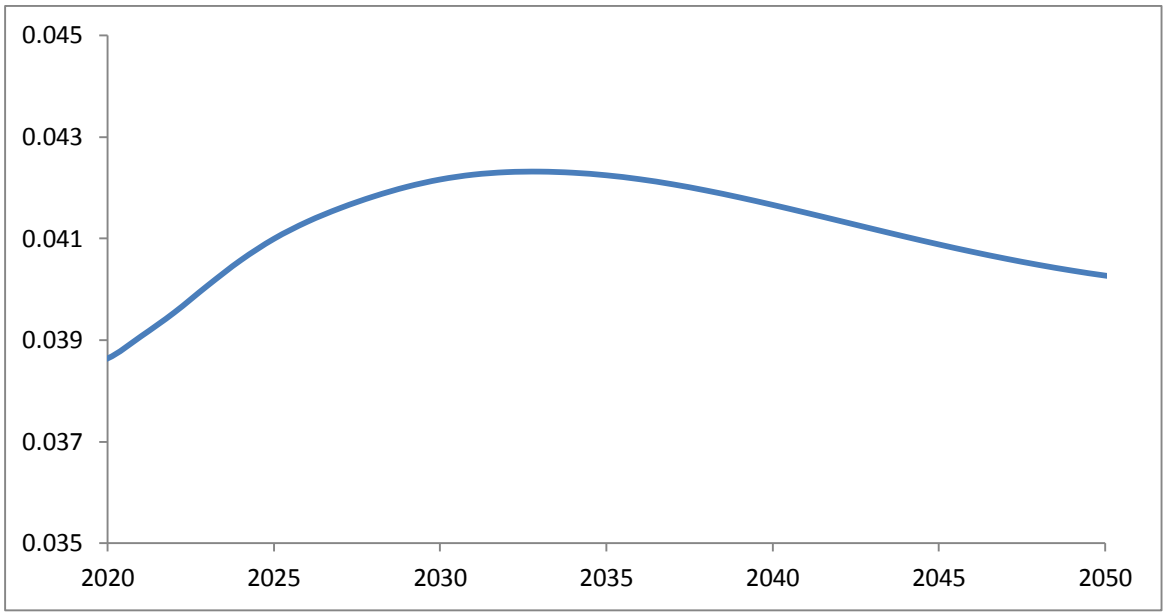


Figure 7A.17: GDP Growth under the Mild Fiscal Rule; 2015-50



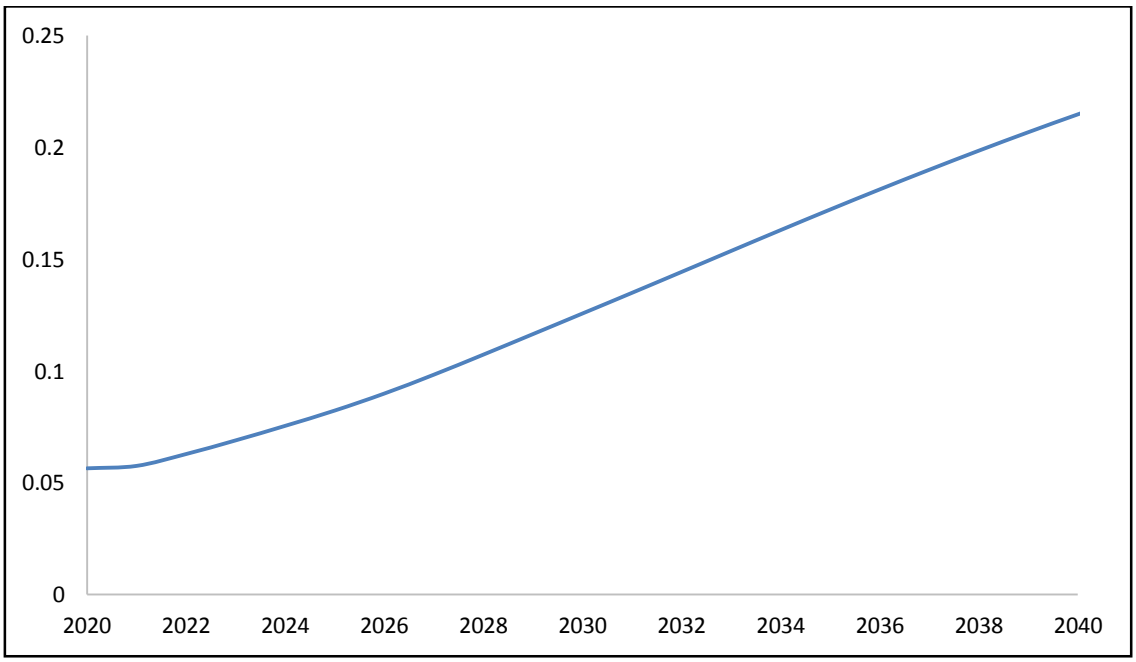
Of course, this is a very mild response to excessively high unemployment, but once again the model indicates that in the absence of inflation, fiscal expansion is an effective means for a monetary sovereign to achieve tight full employment. The ideal is to do so more quickly and without an inflation barrier preventing tight full employment from being achieved. This requires the institution of a job guarantee, as will be discussed in the remaining chapter.

There are many experiments which can be performed using a model such as this one, but only one further issue will be addressed here. Suppose there is an increase in Kalecki's degree of monopoly after 2020, beginning in 2021, increasing the mark-up over labour costs, and reducing the (real) wage and the share of labour income in GDP. Income inequality cannot be discussed directly in this model, but this shift from of income share from labour to capital can proxy for an increase in income inequality.

Suppose the mark-up increases from 0.65 in 2020 to 0.85 in 2040. This reduces the wage share in GDP gradually from 60.6% towards 54.05%.

Stating with the base case results in 2020, the predictions of the model for unemployment are as follows:

Figure 7A.18: Unemployment with a Rising Degree of Monopoly; No Fiscal Response; 2020-40



If the mark-up then stops rising, then eventually rising wealth on the part of the recipients of capital income leads to additional consumption, which brings the unemployment rate back

down, so that it eventually settles in the model at an only slightly higher rate than in the base case. However, this of course abstracts in an unjustified way from the severe economic and social consequences of a prolonged period of mass unemployment, driven by the increase in the Kaleckian degree of monopoly in the economy.

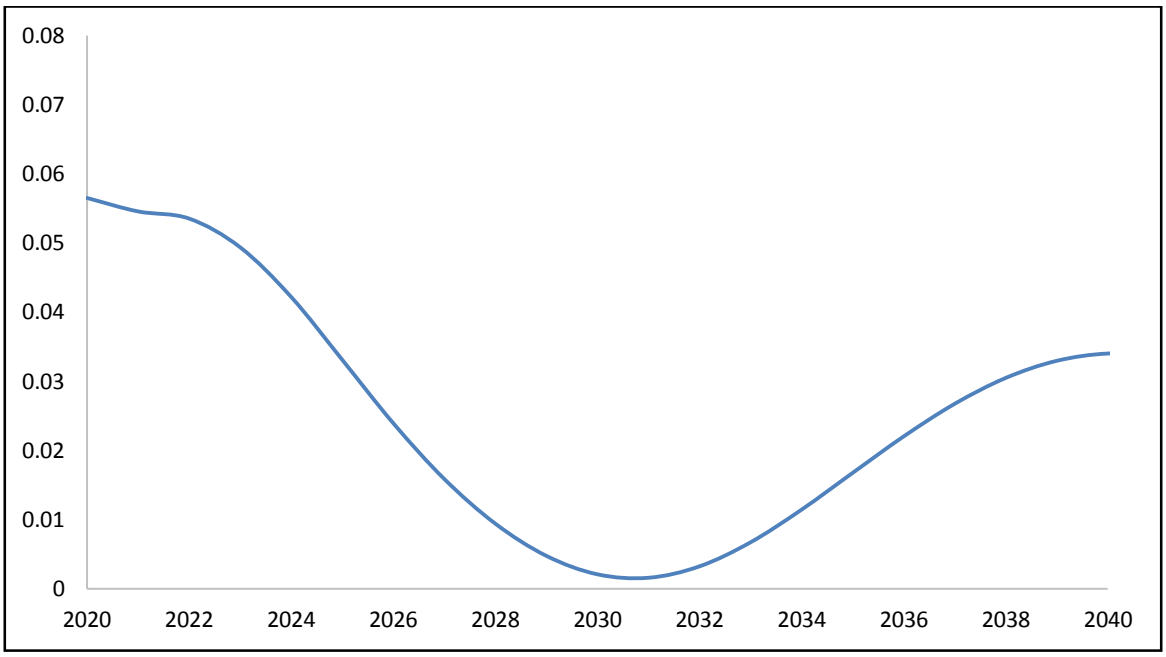
The solution of politically conservative, or more correctly neoliberal, policy makers of recent decades has been to relax monetary policy and financial regulation to encourage growing private and especially household debt, and rising speculative asset prices, to support demand. We have already suggested that this offers no permanent solution.

It would of course be better not to allow the shift in income from labour to capital in the first place. However, it is worth repeating that fiscal policy on the part of a monetary sovereign government can deliver tight full employment, even under these circumstances. It is also true that tight full employment in itself then increases the bargaining power of labour, and helps to reduce the 'degree of monopoly' in the economy, and to make the distribution of income and wealth more equitable again. This is not an outcome which can be represented in this simple model, but is justified by the history of the post-war era in capitalist economies.

Applying a fiscal rule in the context of this growing profit share in GDP, but this time setting $\omega \; and \; U^*$ at 10 and 0 respectively, so that the government responds aggressively to unemployment, though not to the degree of monopoly itself, produces the following result:

Figure 7A.19: Unemployment with a Rising Degree of Monopoly;

Aggressive Fiscal Response; 2020-40



This simple and mechanical fiscal rule demonstrates that fiscal policy can be used to maintain close-to full employment, even when the share of wage income in GDP is, and has been, falling, and inequality is rising. And of course, for a monetary sovereign, there is no question of full employment being in any sense 'unaffordable'.

There is a positive impact on the ratio of government debt to GDP, with that ratio now rising towards 150% during and immediately following the increase in the Kaleckian mark-up, but then falling back towards a steady state of about 120%, which is almost exactly the same as

what would have happened in the model with no fiscal response. It is a consequence of the rising profit share in the private sector, and not of government fiscal policy.

The use of fiscal policy to deliver and maintain full employment does not in itself add to the long term debt ratio. The amount of government debt in this system in the (very) long run is determined by the net savings decisions of the foreign and domestic private sectors.

In their more sophisticated 'growth model prototype' (2006, chapter 11), Godley and Lavoie provide a detailed algebraic treatment of the steady state of a model with over 100 equations, which is far more realistic than the model presented here. They derive a steady state ratio for government debt to GDP 'where the ratio is in no degree an aspiration or policy decision of the government but a logical implication of the sum of private sector aspirations (mainly stock-flow norms) over which the government has no direct control' (p443).

> **"It necessarily follows that the steady state budget deficit is determined by private net saving, rather than the other way round, and that the budget balance must normally be in deficit. This is in accordance (or at least consistent) with one of Minsky's major contentions, but it is quite inconsistent with the ignorant assumption often made by politicians that the budget balance should be zero.; it is also inconsistent with the Maastricht fiscal rules."**
>
> (Godley & Lavoie 2006 [2012], p444)

The values of the policy variables and parameters used in Model 7A, base case, were as follows:

$g_g = 0.04$; $\theta = 0.15$; $r = 0.02$; SOLR = 0.15

$\mu = 0.65$;$\psi = 0.02$; $\delta = 0.03$; $a_0 = 0.01$; $a_1 = 0.10$; $a_2 = 0.02$; $a_3 = 0.02$;

$u^* = 0.7$;$q^* = 1$; $COR = 3.5$; $\alpha_{10} = 0.9$; $\alpha_{11} = 4$; $\alpha_2 = 0.1$; $\pi_b = 0.02$

ζ = 1; $POR = 0.5$; $\gamma = 0.1$; $\lambda_0 = 0.6$; $\lambda_1 = 0.02$; $\lambda_2 = 0.38$ $g_{LF} = 0.04$

W = 1 (the price level P is always fixed at 1 in this model); APL = 1

Chapter Eight

An Employer of Last Resort: A Job Guarantee

"We must develop a federal program of public works, retraining, and jobs for all—so that none, white or black, will have cause to feel threatened"

(Martin Luther King Jr 1965, quoted in Forstater 2016)

"The whole of the labour of the unemployed is available to increase the national wealth. It is crazy to believe that we shall ruin ourselves financially by trying to find means for using it and that "Safety First" lies in continuing to maintain men in idleness."

(Keynes 1929)

8.1 Involuntary Unemployment Always and Everywhere Reduces Subjective Well-Being

The experience of involuntary unemployment is almost unique, in the sense that it has a significant and long lasting impact on life satisfaction. We never fully adjust to unemployment. It shifts the baseline for subjective well-being (SWB), with permanent effect. A variety of studies carried out by psychologists and economists, using panel data on the determinants of subjective well-being, have confirmed the negative impact of unemployment on the quality of people's lives (for example, Clark 2006).

Unemployment, always and everywhere, reduces subjective well-being. Any significant unemployment is a social problem, quite independently of any lost output associated with an output gap. We have available to us a means of eliminating this particular social problem - a job guarantee scheme. A permanent and comprehensive employer of last resort is a desirable foundation for employment policy, and a potentially effective instability thwarting mechanism to stabilise an unstable effective demand for labour.

It is a simple idea - the notion of a guarantee of employment, up to a certain number of hours a week, at a socially acceptable minimum wage. A scheme administered locally, but funded centrally by a monetary sovereign government, involving the substitution of an employer of last resort for a buffer stock of the unemployed, as a mechanism for dealing with the inability of the private sector to provide full employment and an acceptable degree of price stability.

The framing of effective public policy must take into account people as they are and the economic and financial system as it exists, to slightly paraphrase the quote from Coase with which I opened my first chapter. Real people are emotional, reference dependent, social beings. They are affected by uncertainty, and an inability to control their opportunities and outcomes. They deal with uncertainty by looking for reference points. They are limited in what they can know and in their ability to solve complex problems. They react to changes in the things that matter to them. They often make decisions using System One thinking, and frequently make apparently avoidable mistakes. They don’t always exercise self-control. They

often form opinions, including of what is fair and what is unfair, with a self-serving bias, or by anchoring on information which may not be relevant and may be misleading.

They are affected not only by the opinions, but also by the well-being of others. These subjective impressions of fairness and unfairness matter. They suffer emotionally, and this can and regularly does affect their mental and physical health.

Much of their thinking is intuitive. They frequently make decisions and then later rationalise them. These are the sometime optimists who set up small businesses, despite the evidence that most new businesses fail. These are the aspirational consumers who seek to keep up with their neighbours on the hedonic treadmill.

This is what it means to be human – to have evolved over many centuries in a very uncertain and dangerous environment which cannot be fully understood, to fear uncertainty and powerlessness, and to cling to what is known and what is believed to be known, even while understanding that what can be known is very limited.

Such people exist abundantly in real life, but are absent from the orthodox models used to forecast economies and simulate policies. They are, to this day, too rarely discussed in many university economics departments. Whole economics degrees can still be completed without ever once encountering a ‘human’.

For such people, the opportunity of secure employment is of importance for their emotional and physical well-being. Meaningful employment satisfies real human needs, on a variety of levels, and delivers social status. Since the world consists of such people, we ought to have an appropriately designed job guarantee, to meet those needs.

Kahneman and Tversky (1979) were amongst the first to demonstrate that real people evaluate outcomes and life experiences relative to reference points, or benchmarks. We are reference dependent. Moreover, we tend to compartmentalise decisions and events, rather than take them into account only as a small part of our overall life experience, so that our current state of subjective well-being is heavily influenced by sometimes apparently trivial events in the recent past, or at least events which we have had recently drawn to our attention. This can be referred to as 'mental accounting', and contributes to 'availability bias'.

We react to changes, or to values relative to reference points, more than we do to absolute values. This is easily demonstrated to be a normal human characteristic, simply by showing that people's perceptions of heat and cold, or other perceptual variables, are as strongly influenced by changes in the intensity of the affect as by the absolute temperature itself (Glimsher 2011). We evaluate our decisions and circumstances in this reference dependant way.

In the context of income or wealth, or social status more broadly, it suggests that we are most likely to evaluate our well-being by comparing our position relative to our own recent past

experience, to our prior expectations, or to those people we closely identify. In addition, that reference points shift over time, and notions of equality and of equity are often more important than absolute real incomes. We know this intuitively, and there is plenty of evidence to support the idea, some of which was cited in chapter four and will be cited again below.

In the context of income or wealth inequality, Prospect Theory suggests that disadvantageous inequity (rather than inequality, per se) is liable to have a greater impact on emotional well-being than advantageous inequality. Even if people do not care about the well-being of others, and derive positive well-being from advantageous inequality, from a social welfare perspective, reference dependence and loss aversion give us a powerful argument in favour of an equitable society which is not dependent on any notion of a diminishing marginal utility of wealth. This is a more powerful argument, for an intelligent social species. However, we know that people often do care about the well-being of others, and depending on how circumstances are framed, often dislike advantageous inequality, especially if it is perceived as inequitable.

Even if there was a trade-off between equity and economic growth, equity should normally take precedence. As it is, there is no evidence of such a trade-off, and indeed the opposite may be true (Ostrey et al 2014). Moreover, the most successful societies, according to a wide range of measures, are generally relatively equal and apparently equitable ones (Wilkinson 2006). The key is not so much material inequality, but perceptions of unfairness.

There is no objective measure of well-being, and for some economists this implies we ought to ignore the issue, and simply assume that real personal disposable income is the best available measure of well-being, in which case, in the aggregate, only economic growth (positive effect) and, more often than not, the size of government (negative effect) matters. Considerations of how happy people feel about their lives, or of their reported life satisfaction, are seen as unscientific and invalid. As I have explained, according to orthodox utility theory people's preferences can best be understood by examining the decisions they make, with the implication that governmental institutions often distort those decisions and undermine well-being.

The responses individuals give to questions relating to well-being are admittedly highly context dependent, easily influenced by question ordering and framing, and hard to compare across surveys due to differences in scaling and other factors. However, in recent years a number of studies of the impact of personal characteristics and life events on subjective well-being have been published by psychologists and economists, using panel data from a variety of national and international surveys. Regardless of whether simple or more complex econometrics has been employed, the conclusions drawn from the data have been fairly consistent. That is:

- Most people have a baseline level of subjective well-being (SWB), to which they revert over time, even following a variety of major positive or negative life events. The overwhelmingly most important determinant of this baseline for SWB is individual personality traits. Even events such as marriage, divorce, illness, disability, winning a

lottery, or other significant life events have at most a marginal impact on baseline SWB. In most cases, even though negative life changes evoke a stronger emotional response than positive life changes, consistent with loss aversion, the impact is mainly if not entirely temporary. This applies in most cases even after an accident leading to severe disability. Time passes, people spend less of their time thinking about the change in their circumstances, and they revert, more or less, to the SWB they had before. Often, this is within a few months, and generally within about four years (Kahneman & Krueger 2006). This is the 'adaptation effect', defined by Frederick and Loewenstein (1999) as 'a reduction in the affective intensity of favourable and unfavourable circumstances'.

- Beyond a certain level, increases in real income over time may not shift baseline SWB, or at least not very much - the basis for the controversial Easterlin Paradox (1974; 1995). In its strictest form, the Easterlin Paradox might now have been explained away, so that it is reasonable to argue that increases in real incomes are positively associated with reported life evaluation at all levels of income, although not with other measures of emotional well-being (Kahneman & Deaton, 2010). However, most of any such positive impact on life evaluation appears to be due to comparisons with the recent past, and can therefore be attributed to adaptation. Most of what remains seems due to social comparison effects with others at home or internationally (Clark et al. 2008). It is not unreasonable to conclude that changes in absolute, as opposed to relative, real income, like the majority of other life events, rarely have a significant

and permanent impact on subjective well-being for those with above median incomes in higher income societies.

- While it is possible to torture the data with econometrics in an attempt to justify some remaining positive link between SWB and incomes, or to talk about an inevitably rising reference point as material aspirations increase ('the hedonic treadmill' or 'preference drift') , as in Frey & Stutzer 2002), the simple fact that in most countries a very significant increase in real incomes has been combined with no change in average reported SWB, is difficult to dispute. Economic growth in high income countries looks to a large extent like an arm's race, with negative externalities quite unrelated to any ecological costs that economic growth might generate.

- Unemployment on the other hand, like persistent pain, has an apparently permanent effect on SWB. It significantly shifts baseline SWB. Some studies find evidence that the unemployed do partially adjust to the experience (Georgellis et al. 2008), but there are other studies that find no significant evidence of habituation at all (Clark 2006).

- This is also true, though to a lesser extent, of underemployment, and of insecure employment (De Cuyper & De Witte 2006; Mandal et al. 2011; Ochsen & Welsch 2012)

- The reference point for most people is full employment, or at least the absence of involuntary under and unemployment. Falling below this reference point is a significant and persistent loss compared to the established social norm, and can be

expected to have a negative impact on subjective well-being and social cohesion, based on relative deprivation theory (Walker & Mann 1987).

- An experience of involuntary unemployment seems to affect reported well-being negatively, even subsequent to a successful return to employment. People who have been unemployed are permanently affected by the experience. This is, obviously, very serious news for countries with mass youth unemployment (Lucas, R.E. et al. 2004), and once again this is independent of any impact that unemployment may have had on human capital, and therefore productivity.

- The experience of unemployment may have a greater impact on SWB in a more individualistic culture (Mikucka 2014).

- Higher levels of localised unemployment, even though they imply a reduced likelihood of finding employment, reduce the impact of unemployment on the SWB of the unemployed. This is because the social comparison effect is strong enough to outweigh the implications for the probability of re-employment. However, a higher level of unemployment reduces the subjective well-being of those currently in employment (Clark 2006).

- The ability to choose hours of work is of value. Partnered female workers may on average have higher subjective well-being in part-time than full-time employment (Gash et al. 2010). For male workers, it is generally the other way around (Booth & van

Ours 2009). This conforms to the gender identity hypothesis of Akerlof and Kranton (2000), which is partly due to social norms and self-esteem, and partly an asymmetry in the division of labour within households.

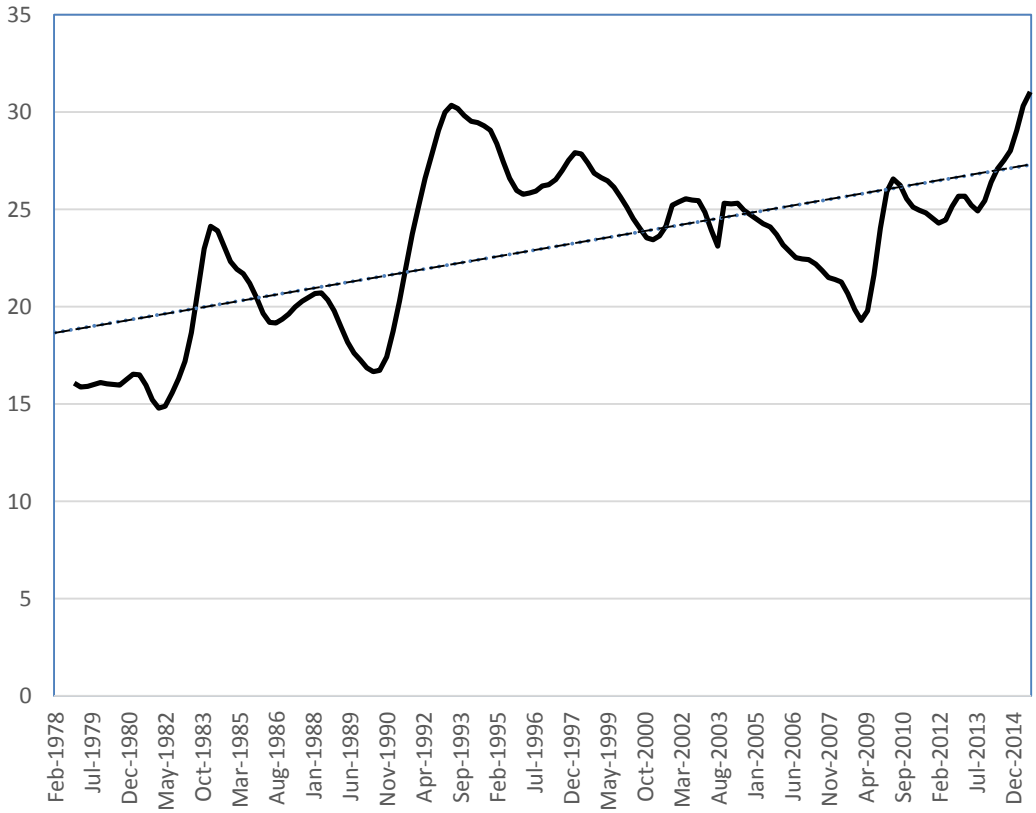
- The above results apply, even when other influences on subjective well-being, such as real incomes, have been adjusted for. The main impact of unemployment and underemployment on subjective well-being does not appear to be financial, but emotional (Berchick et al. 2012).

We also know that many objective measures of social cohesion and social welfare are apparently associated with measures of equality, rather than with income itself (Wilkinson 2006). Inequality and relative deprivation appear more important factors explaining adverse health outcomes, crime, and other measures of social breakdown than income. Wilkinson argues that it is perceived socio-economic status, rather than relative income per se, which is main driving force. There is evidence that unemployment and underemployment are associated with adverse health outcomes, and that this effect is not mediated by poor lifestyle choices, particularly amongst young people (Sadava et al. 2000).

It is reasonable to conclude from the above that the avoidance of significant levels of involuntary unemployment and underemployment, and particularly long term and youth unemployment and underemployment, should be a public policy objective of the highest priority.

The underutilisation of young workers is an important issue in many countries in 2016, and ought to be more widely discussed in Australia, as the following chart shows (Figure 8.1):

Figure 8.1: Australian Underutilisation Rate for Workers Aged 16-24, per cent.



Source: Australian Bureau of Statistics

8.2 Inflation and Unemployment

The orthodox supply side view that unemployment relates either to the incentive to work, or to the characteristics of unemployed workers, is an artefact of general equilibrium models. It

is very unhelpful when addressing the reality of a situation, where involuntary unemployment reflects an insufficient effective demand for workers, as is the situation now.

The Neo-Keynesian pump priming approach, matched with growing public sector employment, was successful in achieving and maintaining something close to full employment in a large number of countries over the period from the 1940s to the 1970s. However, as Minsky identified, its relative success was due to social and institutional factors which were likely to evolve in such a way as to make pump priming more inflationary, and the stop-go policy cycle more problematic. In addition, an untargeted stimulus to total spending is liable to benefit disproportionately those with higher levels of income and better employment prospects, and is unlikely to benefit the most disadvantaged and those most likely to remain long term unemployed. This is consistent with Kaleckian income distribution theory (Tcherneva 2012).

An employment guarantee scheme, on the other hand, should benefit those who most need the help. It should lead to the right amount of net government spending in the right locations; it should be less inflationary and have better ecological consequences; and it would eliminate involuntary unemployment. The unemployed could be hired as and where they are, at a minimum acceptable social wage, so that the willing workers that the private sector does not employ would be offered employment and training until such time as private sector expansion drew them back out of the job guarantee scheme, and into the privately employed labour force.

A well implemented job guarantee would act as a Minskian instability-thwarting mechanism, providing an anchor for inflation and the norms used as a basis for pay negotiations and price setting. To understand this fully, it is necessary to recall the orthodox approach to modelling inflation; to appreciate the degree to which any such approach to understanding the drivers of inflation, when shorn of historical, social, and institutional factors which cannot easily be fit into a mathematical model, is liable to be misleading; and to emphasize the lack of convincing empirical support for the orthodox approach.

The modern, orthodox approach is based on the New Keynesian Phillips Curve, which was equation (2.6) in chapter two:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa(y_t - yn_t) + \eta_t \qquad (2.6)$$

According to the orthodox approach, inflation is supposed to be based on a rational expectations forecast of next period inflation; the output gap between current output and its 'natural' or 'potential' level (in log form); and a random cost-push shock. A more reasonable if old fashioned formulation replaces the discounted forecast of future inflation with a forecast of current inflation:

$$(\pi_t - E_{t-1}\pi_t) = \kappa(y_t - yn_t) + \eta_t \qquad (8.1)$$

This is the Expectations Augmented Phillips Curve. If we replace rational expectations with the implausibly simplistic assumption that expected inflation is simply the previous period's rate of inflation, then the 'accelerationist' nature of the theory is clarified:

$$(\pi_t - \pi_{t-1}) = \kappa(y_t - yn_t) + \eta_t \qquad (8.2)$$

The inflation rate is predicted to accelerate continuously whenever output is above its 'natural' level and to keep falling if output falls below this level. Given that a 'natural' rate of unemployment is associated with the 'natural' level of output, the equation can be rewritten as:

$$(\pi_t - \pi_{t-1}) = -\lambda(u_t - un_t) + \eta_t \qquad (8.3)$$

where u_t and un_t represent the unemployment rate and the natural rate of unemployment, at time t, respectively, and $\lambda > 0$.

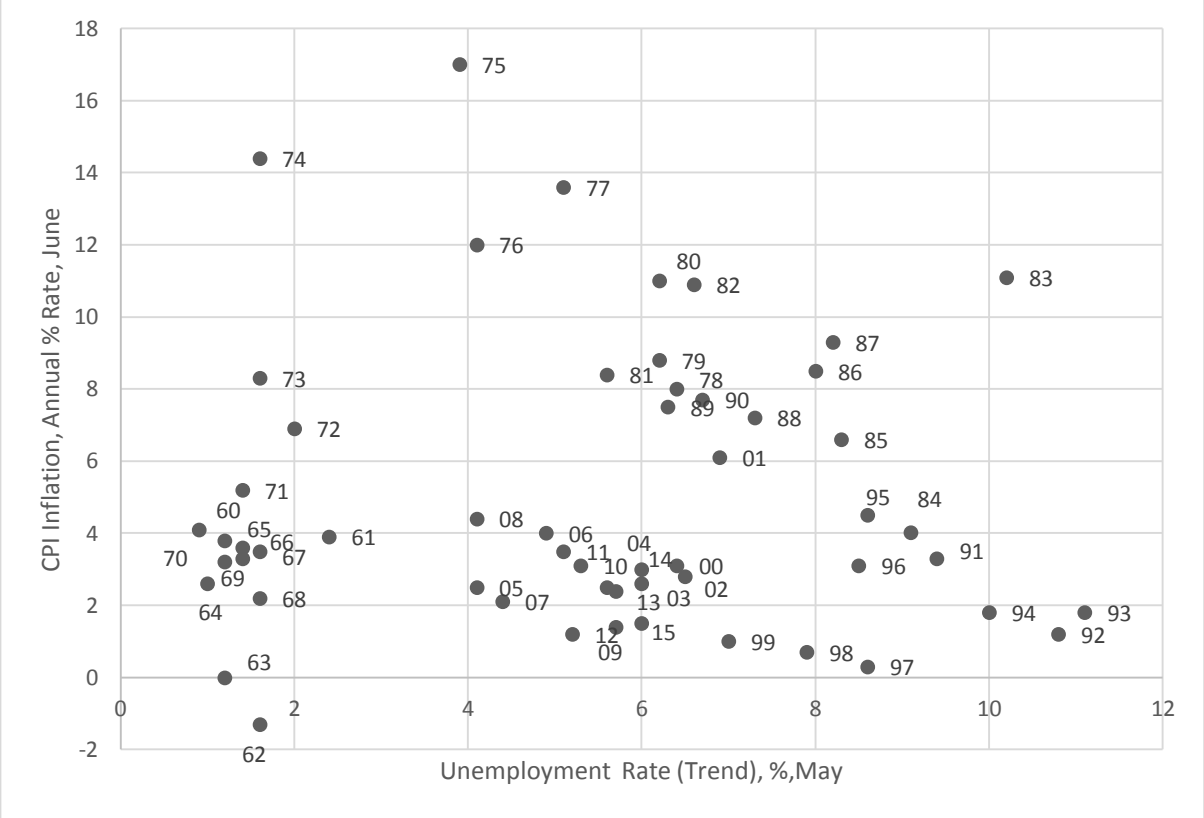
This formulation is very flexible, in that the η_t term is always available to allow for any changes in the inflation rate which are difficult to account for with respect to output gaps. More importantly, the output gap (and 'natural rate of unemployment') itself is a variable which is

free to vary, and for which there is no well-defined and generally agreed set of determining factors. Indeed, in addition to trends for output, data for recent inflation and unemployment data are commonly used as inputs in the process of estimating current 'potential' output (de Brouwer 1998; Alichi 2015).

However, there remains one big problem with the 'accelerationist theory'. It is the fact that significant variations in unemployment, which are difficult to account for as being due to changes in any 'natural rate' of unemployment or trend growth for productivity, regularly happen with no evidence of either continuously accelerating or decelerating inflation as a result.

For example, the following chart of inflation and unemployment rates for Australia from 1960 to 2015, does not appear to provide much evidence, if at all, for the natural rate or 'accelerationist' hypothesis (Figure 8.2):

Figure 8.2: Australian Inflation and Unemployment, 1960-2015



Source: Australian Bureau of Statistics

It is possible, based on historical social and institutional factors, rather than on empirical testing, to divide up this 55 year period into three periods of relative stability regarding the social norm for inflation, and two periods of disturbance, change, and transition.

The period leading up to the early 1970s was a period of relatively stability, with CPI inflation sitting approximately in the range 0-5%, and averaging approximately 2.5% pa across the 1960s. This was a period of full employment, as the chart shows, with an average rate of

unemployment of about 1.5% and virtually no underemployment, and growing public sector employment. The average rate of economic growth was approximately 5% per annum, labour productivity was rising, union membership was high, and the bargaining power of labour was able to limit Kalecki's 'degree on monopoly' in the business sector. Hence, real wages rose in line with increasing productivity, and inequality fell.

Broadly similar circumstances existed in other high income economies during these years, for similar reasons.

By the end of the 1960s, there had been something close to full employment for nearly thirty years, and rising real wages and secure employment were social norms. At the same time, the broadly Keynesian architecture of the global economic system, was coming under strain and beginning to break down. The collapse of the Bretton Woods system of fixed exchange rates, falling productivity growth, and eventually a major energy price shock, undermined the post war consensus, and replaced an apparently stable economic system with a much more uncertain and unstable one.

This did not start with the rapid increase in the price of oil in 1973, but there is little doubt that it was a significant contributory factor to what happened to inflation in Australia and elsewhere in the period between 1972 and 1975, which were years of transition. The increase in the cost of oil necessitated a fall in Australian real incomes, relative to what they would otherwise have been. Given cost plus pricing by employers, and real wage resistance by

workers, and in the absence of effective instability-thwarting institutions, this was a recipe for accelerating inflation, regardless of the rate of unemployment.

The downward pressure on the share of wage income in real GDP associated with the energy shock can be explained with reference to Kaleckian income distribution theory and equations (3.10) and (3.9) from chapter three:

$$W/Y = 1/(1+m.j) \qquad (3.10)$$

$$j = (W+M)/W = 1 + M/W \qquad (3.9)$$

(3.10) is an equation for the before-tax share of wage income in GDP, where *M* denotes material costs; *m* is the pricing mark-up over labour and material costs, covering both overheads and before-tax profits, and dependent on 'the degree of monopoly'.

If the degree of monopoly and the mark-up don't change, then an increase in *j,* due to a significant increase in the relative price of oil, puts downward pressure on the share of wage income in GDP, and upward pressure on the share of capital income out of a diminishing real GDP.

Against the background of prolonged full employment, an apparent social contract that real wages would continue to rise as before, and with powerful trade unions, it appeared that social conflict inflation was likely. This is particularly the case given that the increased economic uncertainty provided greater scope for what Babcock and Loewenstein (1997) called *self-serving bias* in assessing what are reasonable wage claims. I contend that this description of the changing circumstances between 1972 and 1975 is far more useful than any version of the New Keynesian/Expectations Augmented Phillips Curve.

The period from 1976 to 1990 was overall far less successful in terms of economic outcomes than what had come before, and was characterised by much higher levels of unemployment, and the beginnings of significant underemployment, amongst people forced into part-time work for economic reasons. Monetarism and supply side reforms worldwide transformed the norm for what could be expected from governments, particularly in the context of the labour market; privatisations and financial deregulation helped to create the conditions for Minsky's 'money manager capitalism' and growing financial fragility; and tax reforms greatly decreased the progressivity of tax systems. Unemployment remained very high, compared to the norms of the 1950s and 1960s, but was highly variable, without apparently causing a continuous decline in inflationary pressures. (The 1984 data point is an outlier, representing the end of a drought, a year of falling oil prices, a very brief period of relative exchange rate stability for the Australian dollar, and the temporary effects of a new government's wages policy). It is very difficult to describe this as rightward and later leftward shifts in a 'natural' rate of

unemployment. It is better to reject the natural rate hypothesis as a useful description of history.

Against the backdrop of a severe recession, there was a further transition, partly due to global factors, but greatly exacerbated by monetary and fiscal policy, in the early 1990s. Between 1990 and 1992, the rate of inflation fell in Australia decisively enough, so that the combination of mass unemployment and underemployment; subsequent reforms to the labour market and structural changes to the economy that undermined the bargaining power of labour and increased Kalecki's 'degree of monopoly'; an increasing supply of goods and competition for domestic labour from low wage workers in China and other emerging economies; for the majority of the period low energy prices; and, from 1993, an increasing acceptance that an independent central bank would set interest rates to stabilise inflation at or near a published target band, all helped to restore the social norm for inflation to a level similar to that of the 1960s.

What has not returned to the norms of the 1950s and 60s is the unemployment rate. Indeed, it is misleading to compare unemployment rates over such a long period. There was virtually no underemployment in the 1960s, yet now it amounts to about 9% of the labour force, so that the 1.5% norm for unemployment which existed in the 1960s perhaps ought to be compared not with a current norm of about 6% for unemployment, but a norm for the underutilisation rate of approximately 15%.

Given the evidence that involuntary underutilisation has an impact on subjective well-being; the importance for social cohesion generally of achieving and maintaining tight full employment; and a presumed desire to retain the low norm for inflation which has prevailed, the institutional problem we face is how best to achieve full employment, while not increasing the fragility of our ecosystem, and without sacrificing the current inflation norm.

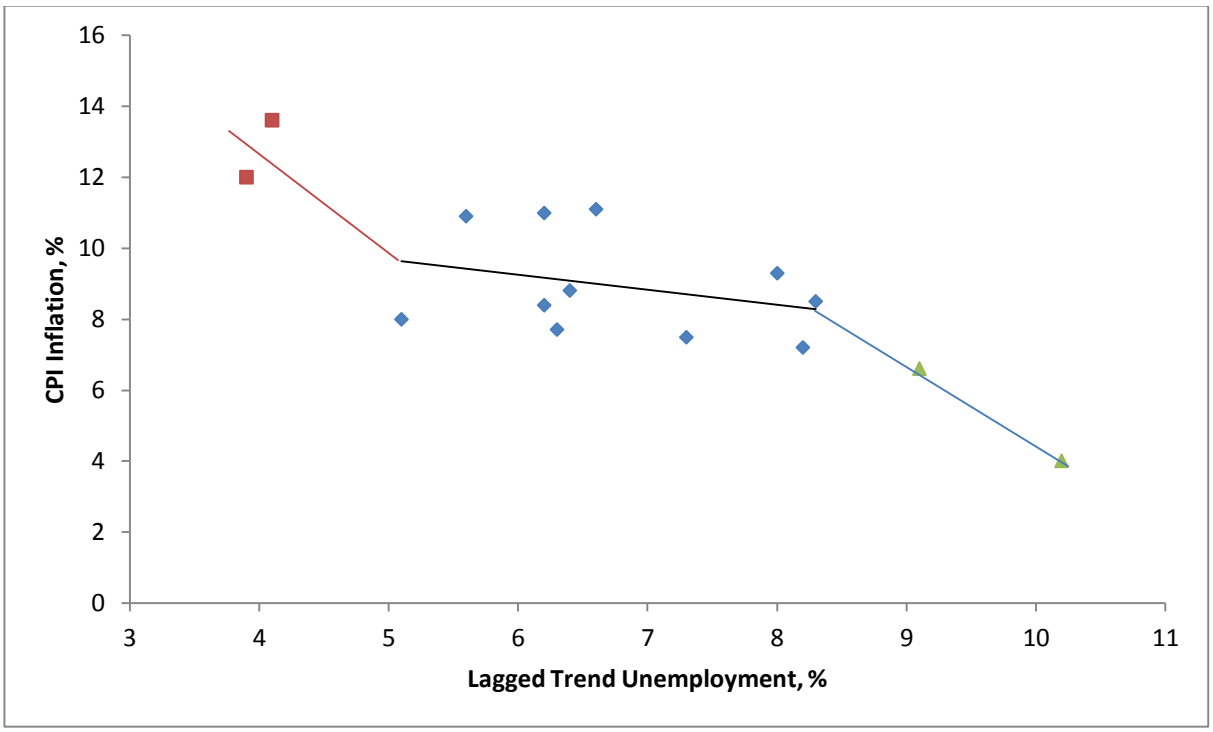
A job guarantee is the key element in this institutional framework.

8.3 A Three Part Non-Accelerationist Phillips Curve

If we are to reject the expectations augmented Phillips Curve as a useful tool to use for the discussion of a job guarantee, the question which arises is what to put in its place. The first observation I would make is that there are statistical correlations in the data which are suggestive.

Plotting the annual rate of CPI inflation against the one year lagged trend unemployment rate, for 1976-90 (Figure 8.3):

Figure 8.3: Australian Three Part Phillips Curve, 1976-1990

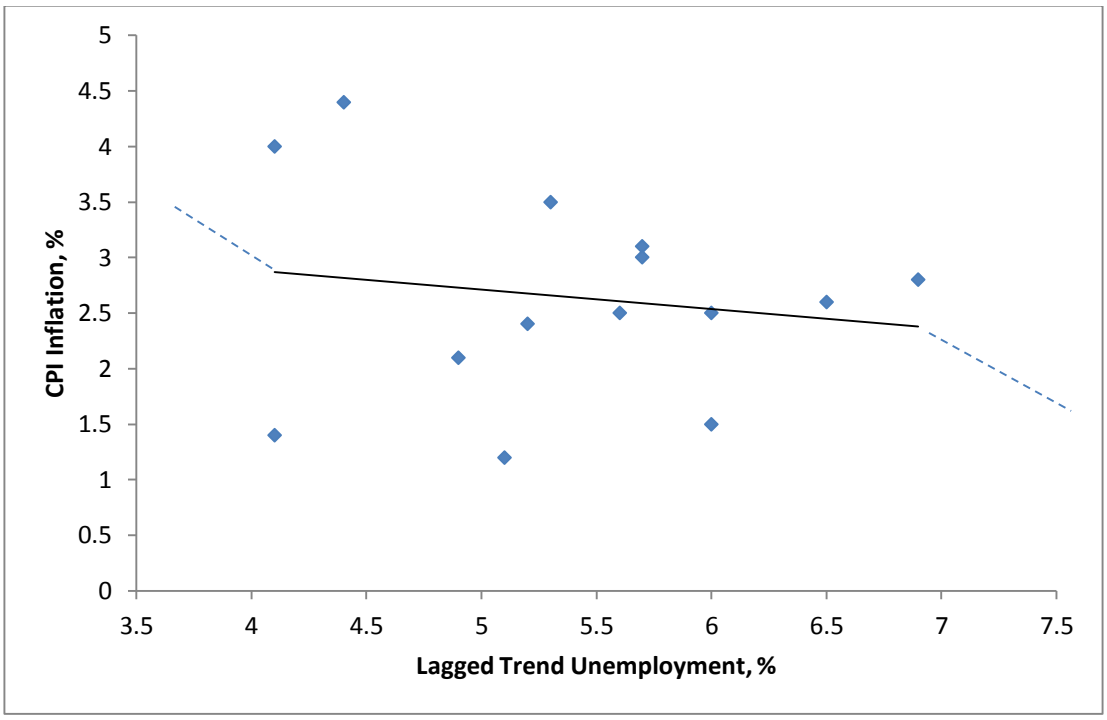


Source: Australian Bureau of Statistics

Unsurprisingly, the slope coefficient for the middle section of the 'curve' is not statistically significant. The period roughly equates to the period when the post-war commitment to full employment had been abandoned in Australia, but the shift to an independent central bank setting the cash rate in pursuit of a fixed inflation target had not yet been introduced. It is reasonable to say that the data can be interpreted as supportive of a Three-Part Phillips Curve during this period.

Repeating the analysis for the years 2002-12, in Figure 8.4:

Figure 8.4: Australian Horizontal Phillips Curve, 2002-12



Source: Australian Bureau of Statistics

Once again, the slope coefficient is not statistically significant. Replacing the headline inflation rate with a measure of core inflation does not change this essential result. This period is also not inconsistent with a 'three-part non-accelerationist Phillips Curve'. It has been selected because by 2002 the inflation targeting regime, economic globalisation and the modern day 'neoliberal consensus' regarding economic management were well embedded. It can be argued that the economy was never close enough to full employment to significantly raise the rate of inflation, nor was the output gap sufficiently large to push the economy towards price deflation.

As explained above, there were periods of transition in Australia in the 1970s and 1990s which shifted the inflation norm, and also the socially acceptable rates of unemployment and underemployment. The 1970-75 period saw a shift upwards in the inflation norm, which opened the door for a shift in economic policy making towards measures advocated by 'natural rate' supply siders like Friedman, and consequently the embedding of a higher norm for unemployment. The 1990s saw a shift in the inflation norm back downwards, for a host of institutional, social and global economic reasons highlighted in chapter three. The norm for what is an acceptable rate of underutilisation has not reverted to pre-1975 levels, either here or in the majority of other high income countries. Given the importance of secure employment for subjective well-being and social cohesions, this is a highly significant issue.

The above is not intended to be a sophisticated and detailed analysis of the data, but it does at least suggest that for Australia, the historical relationship between price inflation and unemployment can be sensibly interpreted using simple three-part Phillips curves, rather than a reliance an accelerationist theory where changes in inflation result from deviations in unemployment from some more or less mythical 'natural' or 'potential' rate. While changes in the unemployment rate, and especially large changes in the unemployment rate, are widely publicised and highly available in wage setting and pricing decisions, and have the capacity to shift the inflation norm, a decrease in unemployment below some equilibrium rate does not cause permanently accelerating inflation.

The height of any horizontal section to such a curve, the points where the curve becomes downward sloping, and the potential for the curve to shift significantly over time, depend on the institutions in place to stabilise inflationary pressures. If we are to achieve tight full employment without inflation rising significantly, and without the norm for inflation shifting upwards over time, then we need appropriate institutions in place to allow for this.

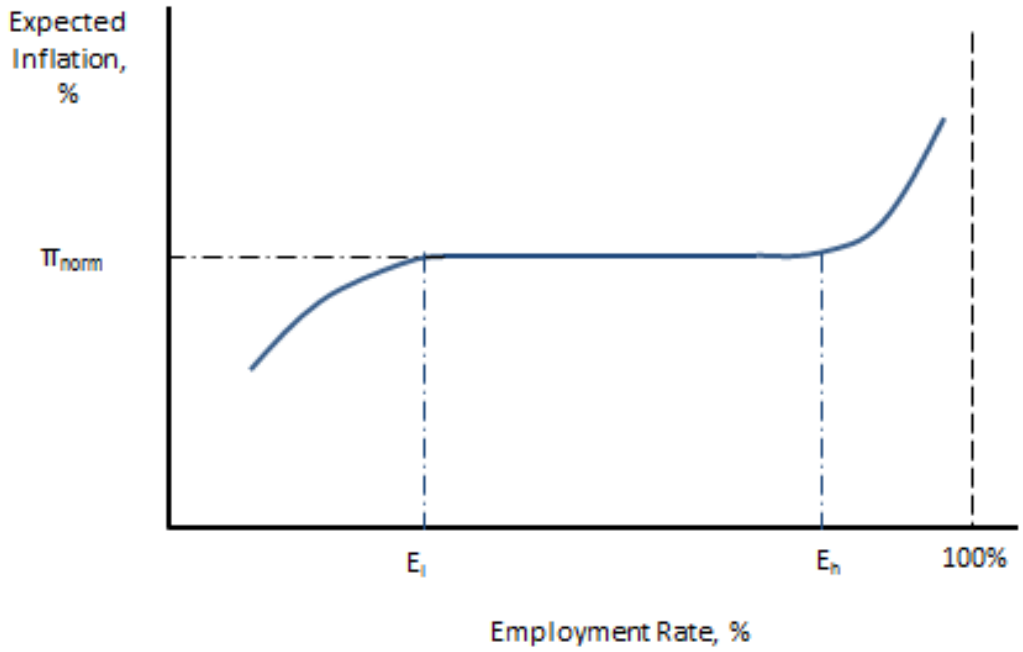
A job guarantee provides a mechanism to achieve a large change in the unemployment rate – essentially, the elimination of involuntary underutilisation – without a subsequent impact on inflation liable to shift the inflation norm. This is because of the buffer-stock nature of job guarantee schemes and the inflationary anchor role played by the job guarantee wage rate within those schemes.

In their 'Growth Model Prototype' (2007, chapter 11), Godley and Lavoie employ a target real wage equation (equation 11.18, p 386) consistent with a 'Phillips Curve with horizontal mid-range settlement'. They justify this with reference to a variety of empirical studies, including Barnes and Olivei (2003). The Barnes and Olivei study compares a piece-wise linear Phillips Curve against a more conventional linear Phillips Curve, using US data from 1961-2002, both for a constant 'natural rate of unemployment' and time-varying Congressional Budget office estimates of the 'natural rate'. The authors not only show that the 'piece-wise' version is a statistically significant improvement to the conventional Phillips Curve. They also show that it performs much better when used as a basis for dynamic simulation. The middle section of

their three part piece-wise Phillips Curve has a slope coefficient which is not statistically significant, which is consistent with a horizontal mid-range segment.

If we are to use such a Phillips Curve relationship to characterise the socially and institutionally conditioned relation which may exist between inflation and unemployment, it seems best to use an approach consistent with the above, where the horizontal section is drawn at the current inflation norm. This is notwithstanding the potential for significant and rapid changes in unemployment to shift that inflation norm. Placing the employment rate on the horizontal axis, where the employment rate is employment as a proportion of labour supply at full employment, we get the following (Figure 8.6):

Figure 8.5: The Three-Part Phillips Curve



The term 'expected inflation' in this context refers to the predicted inflation rate in this period from the diagram, which will not be met if there are significant short run cost push factors not related to the labour market (for example, exchange rate volatility impacting on import prices). Changes in social, institutional or structural economic factors, such as I have briefly discussed above, have the potential to change the inflation norm, shifting the curve up or down, or to change the employment rates limiting the mid-section of the curve.

While the employment rate remains between E_l and E_h, there is no reason to anticipate that moderately paced changes in the rate will have an impact on inflation. If the employment rate rises above E_h, the tightness of the labour market implies the likelihood of rising real wage aspirations in pay bargaining and therefore rising inflation. It is a mistake to describe this as demand-pull inflation. There are still unemployed and underemployed resources in the economy. If the employment rate falls below E_l, the bargaining power of workers is reduced by employment insecurity and the threat of unemployment or underemployment, and inflationary pressures are moderated. As I have said, the location of E_l and E_h will not be constant, with Barnes and Olivei estimating that unemployment rates of between 4% and 6.5% were consistent with stable inflation in the US between 1985 and 2002.

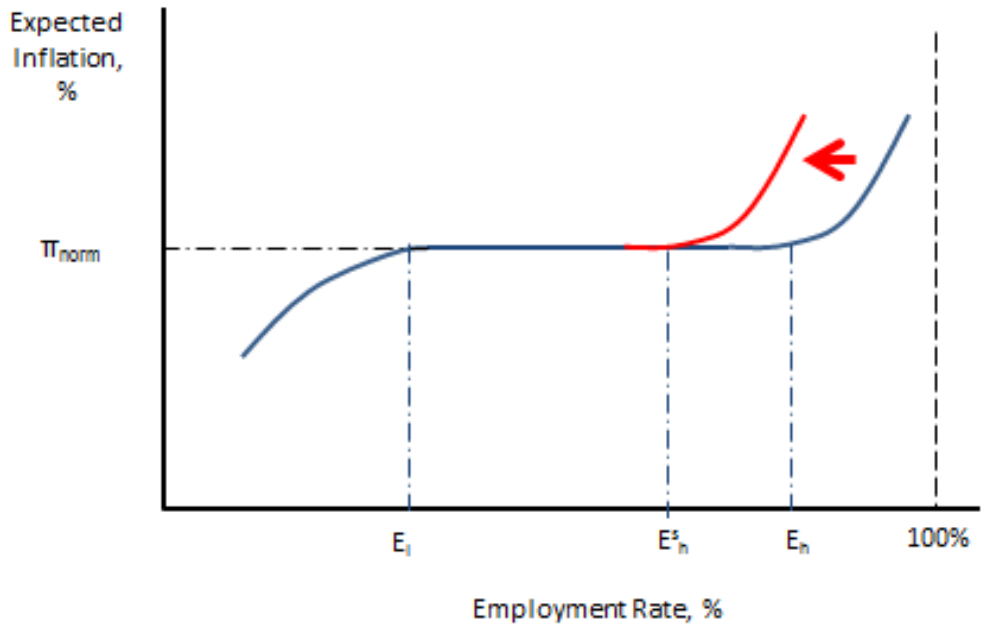
A more subtle 'accelerationist' argument can be rescued from the above. If employment rises above E_h and remains there for long enough, then the new higher rate of inflation will become the social norm, and the continuation of employment levels above has the potential to stoke further increases in inflation. This depends very much on social institutions, however, and is not automatic. In addition, a high level of employment over time has the potential to raise E_h, so that the rate at which non-inflationary employment can be sustained is subject to hysteresis or path dependence.

It does mean that we can, where convenient, refer to (100 - E_h) as a NAIRU rate, in the context of this model of inflation.

The inflation norm seems to have shifted twice in Australia, since 1945. The first time was a big upward shift in the early to mid-1970s, when it was a mix of cost push and institutional factors which were to blame. The second time was the recession of the early 1990s, when both the persistent drop in employment below E_l and the speed with which unemployment rose were the main driving factors.

The impact of a rise in structural unemployment, attributed to occupational and perhaps geographical immobility and a changing structure in the demand for labour in the private sector, can be represented as follows (Figure 8.7):

Figure 8.6: Rising 'Structural Unemployment' and the Three-Part Phillips Curve



In Figure 8.7, the *NAIRU* has increased from *(100 - E_h)* to *(100 - E^s_h)*. Rising inflation at higher levels of employment and capacity utilisation should be seen not as a symptom of an excess demand for labour, but as a sign of a structural and/or institutional problem in the economy, which needs to be fixed.

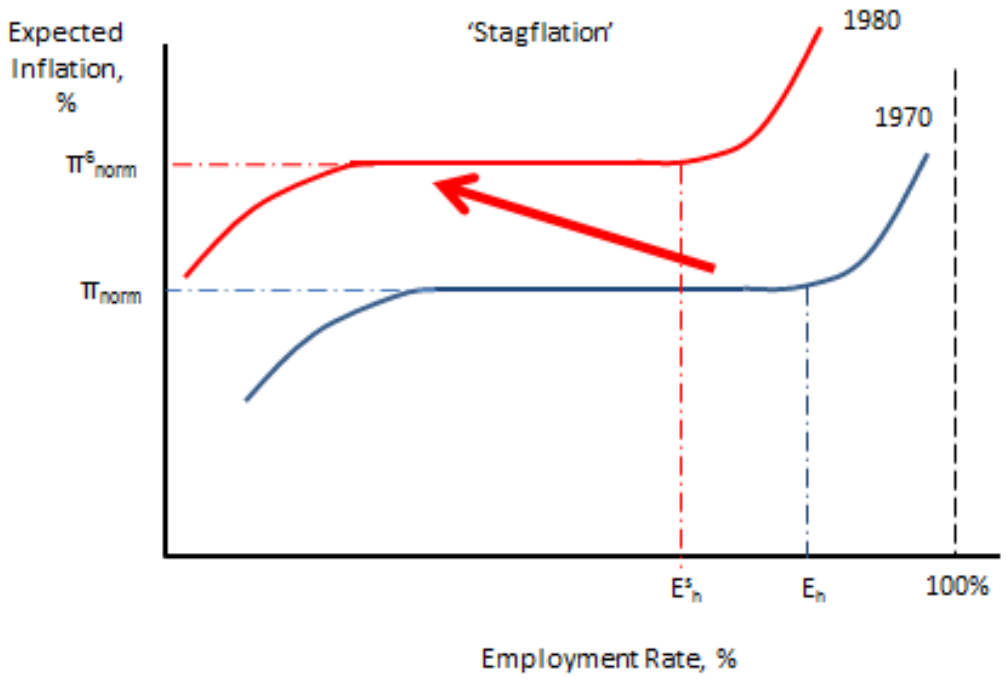
One very real and pressing problem is that the level and structure of real output necessary for the private sector to approach full employment are unlikely to be ecologically sustainable in many countries, in terms of the emission of waste and the excess use of renewable resources, and threats to biodiversity, as well as the eventual depletion of non-renewables (Forstater 2003; Global Footprint Network 2015). Economists such as Daly (1996) and Lawn (2000; 2011) have long advocated the rationing and pricing of ecological resources in order to ensure sustainability conditions are respected; and to refrain, at the micro level, from activities which do not have properly defined marginal social benefits in excess of their marginal social costs. At the macro-level, they believe that a genuinely ecologically-Hicksian definition of real income, such as the Genuine Progress Indicator (Lawn 2003) should be prioritised. The pricing of ecological resources implies an inflation barrier similar to structural unemployment, and one which may bite earlier.

The same logic would apply if the decrease in E_h and the rise in the NAIRU were the result of the imposition of constraints on economic activity designed to limit the damage caused by such activity to our ecosystem, including the pricing of carbon dioxide and other emissions.

The problem in this case is not with the immobility of labour, so much as a need to redirect employment to 'green' activities, or at least activities with less damaging ecological consequences, and possibly even to fairly share out the opportunities for paid employment and real incomes in what must eventually become a steady-state economy (at least, in an ecological sense).

However the NAIRU concept is interpreted within this model, it is important to remember the human consequences of involuntary unemployment and underemployment. It is clear from the above data that not only was there a persistently low norm for inflation post-war in Australia, but more importantly, there was a persistently low NAIRU. E_h was allowed to fall, as the NAIRU rose from below 2% to about 8%, and is unlikely based on those policies currently considered to be orthodox to return to 1960s levels, even given the ageing of the Australian population and the rising dependency ratio which lies ahead of us. While a set of historical, social, and institutional factors permitted the attainment of consistently high levels of employment by conventional Keynesian methods, from the 1940s to the 1970s, those specific factors were temporary and cannot be precisely restored. This does not mean that tight full employment cannot be restored.

Figure 8.7: The 1970s and the Three-Part Phillips Curve



Keynes, Kalecki and Minsky are among the most prominent economist to have noted that the failure to provide for and sustain full and equitable employment is a characteristic failure of capitalist economies. Keynes identified mass unemployment to be the result of a failure of the effective demand for labour, and therefore technically within the power of governments to eliminate. Kalecki (1943) agreed that governments are technically able to eliminate unemployment, but believed that they would not choose to do so persistently, due to considerations of political economy.

What became known as the natural rate of unemployment was just Marx's 'reserve army of labour' by another name. Minsky rejected welfare as a response to the needs of the unemployed and rejected traditional Keynesian pump priming as a sustainable solution to a lack of effective demand for labour. Among other reasons, Minsky believed that both would prove to be inflationary (Minsky 1969). Minsky explained and advocated for an employer of last resort scheme, as an instability thwarting mechanism, and a way to deliver equitable, sustainable, and non-inflationary full employment.

8.4 A New Institutional Framework – Job Guarantees and Mitchell's NAIBER

What is needed is a new institutional framework for delivering and maintaining full employment. It involves guaranteed employment and the replacement in the model of the NAIRU with a NAIBER. NAIBER stands for the 'Non-Accelerating Inflation Buffer Employment Ratio' (Mitchell 1998). The buffer employment ratio replaces the unemployment rate with the ratio of workers in the job guarantee scheme relative to the total available labour force. Mitchell described such an approach as a buffer-stock scheme for labour, where the existing buffer-stock of the involuntarily unemployed and under-employed could be replaced with an employed buffer-stock of workers within a public sector job guarantee. The scheme would be a shock absorber for the economy - expanding to employ workers when they have been shed from the private sector during a downturn, and contracting automatically as the private sector absorbs labour from the job guarantee scheme in an upturn.

Lawn has referred to an ecologically sustainable NAIBER, or ESNAIBER, in the context of a job guarantee as an element in a transition to an ecologically steady-state economy.

The NAIBER could be below or above the NAIRU, once an employment guarantee scheme was in place. The availability of a paid job in a job guarantee might reduce the disciplinary effect that the threat of job losses can exercise on real wage aspirations and inflationary pressure. If so, the NAIBER may be above the NAIRU. On the other hand, competition from an employed buffer stock of replacement workers, as opposed to an unemployed buffer stock, might increase the discipline, in which case the NAIBER may lie below the NAIRU. In any case, those in the job guarantee would not be unemployed, and would be performing work of social value.

It would be a positive supply side measure, as it would retain workers in socially productive employment, when there is no demand for them at an acceptable real wage within the private sector. In addition, training and further education would be offered to participants as part of the scheme.

It would set minimum socially acceptable real wage rates and working conditions across the economy generally, as workers without bargaining power would now always have the option of working in the scheme.

It would be ‘green’, in the sense that those activities carried out within the scheme would either contribute positively to the natural environment or at least would be designed to minimise their environmental impact, free of the need to generate a financial profit.

Godley and Lavoie have emphasized that full employment requires a specific fiscal stance, given the spending and portfolio preferences of the private sector and the overseas sector. The problem is to determine the level of that fiscal stance, given the inherent complexity and uncertainties of the economy. The job guarantee, as I have said, is a bottom-up approach to fiscal policy, which, if well administered, ensures that funds are spent where they are needed and at the level that is necessary to deliver full employment – no more, no less.

An employment guarantee can contribute towards a more stable economy, by taking unemployed workers as they are and where they live, and providing them with the opportunity to undertake work of social value. This eliminates structural unemployment based on either occupational or geographical immobility. It provides a fiscal stimulus which is targeted to those regions where it is needed, and which leads to the employment of those whom the private sector will not currently employ if the economy is to sit below its inflation barrier. Over time, a well-designed job guarantee scheme should not only provide employment of social value, and a variety of psychological benefits to would-have-been-unemployed described elsewhere in this chapter, but would also enhance the marginal employability of job guarantee workers in the private sector.

Labour saving technological change, plus the requirements of ecological sustainability, might gradually increase the size of the job guarantee scheme and the NAIBER over time. Increasing participation as discouraged workers are attracted to join the job guarantee scheme will also increase the size of the scheme relative to the economy as a whole, while the impact of an ageing population will mitigate and could reverse these effects. There is the likelihood that the job guarantee scheme may be required to grow in scale, diversity and complexity, unless or until social attitudes and norms towards employment hours and the role of paid employment in contributing towards well-being eventually change.

Uncertainty in the scale of a job guarantee implies that assessments of the net fiscal impact of such a scheme are difficult to make with confidence. In any case, the fiscal 'cost' of such a scheme would be intended to expand and contract as necessary to offset fluctuations in the effective demand for labour within the remainder of the economy, and the true cost of any such scheme ought to be defined in terms of its net impact on real and ecological resources, and not in financial terms. However, financial projections are required in the effective framing of public policy proposals, and estimates of the purely financial cost of a job guarantee are therefore important. Kaboub (2013) estimates the cost of a generous and extensive scheme in the US, at a time of high official unemployment, at slightly less than 4% of GDP. Fullwiler (2013) uses an extensive open economy stock-flow consistent econometric model to simulate a US job guarantee over time, and shows that the net effect on the fiscal deficit averages out at slightly less than 1% of GDP. These estimates are representative of other studies.

That having been said, the net impact of a job guarantee on the fiscal balance is not the most significant issue. It is the real resources which are used, directly and indirectly, as a result of the scheme being in place which are relevant. Where these resources are labour resources which would otherwise have been unemployed, then in a sense a job guarantee would cost nothing at all:

> **"Beyond this, there is an important sense in which the job guarantee program would not cost anything. The goods or services produced by the labor of the beneficiary of the job guarantee increase the gross national product and the national welfare by as much as the worker is paid as reliably as does any 'free market' labour. The labourer is 'earning' the wage or salary received. Also, and importantly, the worker under the job guarantee program has a job of which the worker can be as proud as are other citizens with their jobs."**
>
> (Gordon 1997, quoted in Mitchell 1998)

8.5 Framing a Job Guarantee

People's willingness to consider a job guarantee scheme depends on how it is framed to participants and the public more widely, and on how the public relate to those who might participate in it. More generally, we must address social attitudes towards the unemployed, underemployed, the insecurely employed and the discouraged. We have had more than three decades of discourse designed to reinforce attitudes amongst the employed that labour market outcomes are an efficient reflection of productivity and effort. More perniciously, we

have financialised, or commercialised, our attitudes towards others, to the point where many see the unemployed as belonging to a different group to themselves, so that they do not identify with them or feel any responsibility for their well-being. This is all part of what Minsky labelled 'money-manager capitalism', in contrast to the 'shared prosperity capitalism' with which it could be replaced.

Anthropologist David Graeber (2011, pp 89-126) argues that there are essentially three types of social attitudes we can form towards others:

- *Baseline communism* - This is 'the understanding that, unless people consider themselves enemies, if the need is considered great enough, or the cost considered reasonable enough, the principle of "from each according to their abilities, to each according to their needs" will be assumed to apply' (p98). 'Baseline communism might be considered the raw material of society; a recognition of our ultimate interdependence that is the ultimate substance of social peace' (p99)

- *Heirarchy* - This is where 'the moment we recognize someone as a different sort of person, either above or below us, then ordinary rules of reciprocity become modified or set aside…a certain action, repeated, becomes customary' (p111) 'Thus does mutual aid slip into inequality' (p119)

- *Exchange* – In this instance, 'what marks commercial exchange is that it's "impersonal".' (p103) 'Exchange implies equality, but it also implies separation' (p122)

> **"We are all communists with our closest friends, and feudal lords when dealing with small children. It is very hard to imagine a society where we wouldn't be both"**
> (Graeber 2011, pp 113-114)

These are insights which have relevance for the potential political barriers to a job guarantee scheme, and to the potential social benefits, broadly defined, from such a scheme. Attitudes to other people are not fixed – they are highly plastic and context dependent, and influenced by the way in which social relationships and responsibilities are framed.

Many, especially on the political right, position the unemployed as somehow different from, or alien to, us – as not part of our community. This is the view of those for whom there is 'no such thing as society'. In which case, they frame labour market relationships in a purely commercial exchange perspective. They might see the unemployed as in some sense potentially their equals, but not their responsibility.

The employed have no social relationships and responsibilities, beyond financial transactions. The unemployed have a responsibility to engage in 'truck and barter' as best they can. 'We' are separate from 'them'. 'We' may not look down on 'them', but 'we' are unconcerned for

their well-being and for any inequality of social outcomes. The notion that outcomes could be inequitable has no meaning to ‘us’.

This view, which has taken root and undermined social well-being, is at least in a sense egalitarian. It assumes others have the same life chances as us; that if they fail to take them it is not our responsibility; that people respond to financial incentives in a narrowly self-interested way; and that this is the appropriate way to organise our economic relations. From such a perspective, Australia’s current superannuation system appears obviously beneficial, in spite of its tendency to entrench inequality in retirement. People have a responsibility and the opportunity to provide for their retirement. Should they fail to do so, we have no responsibility for them. Our view of others is financial and impersonal, as though the whole of life was a business transaction, and moreover a transaction with someone where we anticipate no ongoing relationship.

Some continue to see the unemployed as part of our society, for whom we have some responsibility, but as somehow lacking in the attributes necessary for employment. They lament a lack of skills amongst the unemployed, and/or low levels of literacy and numeracy. They lament unemployment, underemployment and relative poverty amongst indigenous peoples, and amongst some refugee groups. The unemployed are part of us, now, but they are not at the same level as the rest of us. They are dependent, and must remain dependent. They are, perhaps, unemployable, and must be supplied with welfare. This is the logic of a dependency culture. It is essentially a hierarchical attitude towards those vulnerable to unemployment and underemployment. It is kinder than the impersonal exchange view, but

hardly less offensive, and no more effective in building social stability. In this case, we might not like mass unemployment and consequent inequality, but we may see it as inevitable. The unemployed, like the poor, may always be with us.

A third perspective is the one named, provocatively, by Graeber as a form of 'communism'. Baseline communism involves seeing others as both part of the same society of us, and our equals. We share a mutual responsibility for each other. Those currently unemployed or underemployed are not separate from us, and they do not have a different social status and potential for useful employment. 'They' are 'us'. They can contribute towards the national product – not once they have been re-trained or incentivised, but as they are now. This perspective, which Graeber argues is a characteristic of the traditional societies in which our ancestors lived for so many generations, will neither accept the unemployment of others as irrelevant to us, nor see unemployment as inevitable. From this perspective, our relationship with others extends beyond the economic and impersonal to the personal and social.

To 'sell' a job guarantee, policy makers must encourage people again to see everyone as part of the community, where relationships are not defined in narrow, impersonal financial terms, but in terms of mutual obligations and "from each according to their abilities, to each according to their needs".

They should also stress the social losses from a failure to implement a job guarantee – framing the debate along the lines of what we all lose, due to the involuntary underemployment of some.

Attitudes can and need to be shifted towards an aversion not only to disadvantageous inequality (which we all share), but towards an aversion for advantageous inequality, and a concern for the fair treatment of those who would currently not have opportunities for secure employment, in the absence of a job guarantee.

Essentially the same insight can be derived from the paper by Loewenstein, Thompson and Bazerman (1989), which I discussed in chapter four. These authors published experimental data relating to perceptions of fairness and inequality in different contexts. The experiments involved presenting participants with a series of disputes between two people, recording subjective utility scores of a variety of financial outcomes for self and the other, where outcomes were sometimes gains and sometimes losses, in non-business and business settings, and where relationships/attitudes towards the other were described as positive, neutral, or negative.

There were three principal findings, all of which were confirmed in later work by Fehr (Fehr and Schmidt 1999), whose work is in turn referred to by Akerlof and Shiller (2009). I listed them in chapter four, but it is worth repeating them here.

1. ‘The first is that, in situations in which an equal split of resources is the norm, people hate coming out behind – a situation we labelled “disadvantageous inequality”.

2. The second is that how people feel about coming out ahead – whether they like or dislike it – depends on a wide range of factors, such as the nature of the parties’ relationship (whether they like the other person) and the nature of the situation (e.g. whether it is a business transaction or personal interaction).

3. The third is that a major difference between people, when it comes to social preferences is their attitude towards advantageous inequality.’ (Loewenstein 2007, p 182)

Subsequently, Loewenstein argued ‘It is not so much inequality that people care about, whether advantageous or disadvantageous, but departures from fairness.’

Outcomes which are understood to be fair become a norm or reference point against which potential outcomes can be evaluated. Once this is understood, personal gains and losses relative to the subjectively determined (but generally culturally influenced) fair benchmark are evaluated in a way broadly consistent with the Kahneman and Tversky value function, but with a fascinating variation. *For the majority of people, under at least some circumstances,*

advantageous inequality which is perceived as inequitable has a negative impact on subjective well-being. Most people don't like unfairness, even if it apparently works in their favour.

The extent to which situations are framed in a social context or a business context influences our evaluation – particularly of advantageous inequality. *Advantageous inequality is generally seen positively in a business context (where it is less likely to be perceived as inequitable), but is often (and for severe inequality generally) seen negatively in a social context*. It is also seen (weakly, when in a social context) *positively where negative relationships exist between the decision maker and those against whom comparisons are made. It is seen positively regardless of the relationship setting in a business context.*

Where advantageous inequality has positive value and disadvantageous inequality negative value, the resulting value function has similar characteristics to the value function in Prospect Theory – with disadvantageous inequality having a greater psychological impact than advantageous inequality (a form of relative loss aversion).

Where advantageous inequality is seen negatively, the resulting value function becomes tent shaped – with the peak value in at or close to the point of equality of outcome.

Human nature and social attitudes towards what is fair and how to evaluate inequalities are not fixed over time, but are plastic. We are influenced by evolving social institutions and norms, and of course by other people. There are interesting implications relating to politics, economic reform and social changes over the last 30 years. The shift towards Minsky's 'money

manager capitalism' from a mixed economy consensus during that period has financialised social relationships and helped to shift attitudes towards the role of government and other social institutions, appropriate tax and welfare systems, and even to superannuation.

Loewenstein's work, as I explained in chapter four, suggests that political outcomes and social institutions are not governed by stable social preferences (as argued by the orthodox economists), and that there is at best a simultaneous relationship. Hence, the key exogenous factors shifting the determinants of institutions and attitudes over time may be interest group pressures and effective political organisations (and even charismatic political leaders).

8.6 What Makes Workers Happy?

It remains to consider the essential characteristics of a job guarantee from the perspective of the participants in the scheme. In other words, 'what makes workers happy?'. This is an area which has been explored in depth by other social scientists, but has only recently attracted the attention of economists.

The orthodox neoclassical economic model, where consumption is a good but work is a bad, so that those free to select their hours of work do so to balance the marginal utility of consumption against the marginal disutility of work, should by this point appear to the reader

as obviously nonsensical as a guide to policy. It is a construct designed to allow for a nicely mathematical or diagrammatic analysis of labour supply decisions trading off the 'bad' of work for the 'good' of consumption, programmed to deliver the appropriate neoclassical prescriptions for less progressive taxation, 'flexible' labour markets and equilibrium optimal underemployment.

In reality, unemployment and underemployment are often involuntary, and have an impact on well-being which goes beyond a reduction in disposable income or consumption. We know those in employment are on average significantly happier, more satisfied with their lives and healthier than those who are unemployed. We also have a good idea of the reasons for this, and this knowledge should inform employment policy in general and the design of a job guarantee, in particular.

People appear generally happier in

- Jobs which offer secure employment
- Jobs which are of clear social value, and which provide immediate feedback
- Jobs which allow a high level of worker autonomy and creativity
- Jobs which involve a greater variety of tasks, provide opportunities for the use of existing skills, and offer prospects for skill development
- Jobs which allow for the development of social relationships with fellow workers and others

- Jobs where workers are free to choose working hours Jobs where remuneration and working conditions are perceived as fair
- Jobs which are held in respect by others (Van der Meer & Weilers 2013)

Not all of the above characteristics can always be designed into every task within a job guarantee scheme, or be embodied in a private sector job, but the majority of them can be and ought to be. A job guarantee can also assist the private sector in the provision of better jobs, by setting a floor on working conditions, maximising the sense of purpose one obtains from a job, increasing one's involvement in workplace decisions, and guaranteeing a form of secure employment.

There is no single optimal model for a job guarantee scheme. In different countries, and even in different regions within countries, the precise design of the scheme must reflect local needs and the supply and characteristics of those people who are locally unemployed or underemployed who might choose to participate in such a scheme. It should also reflect what is deemed to be politically acceptable.

In Australia, it is expected that local authorities would play the major role in the local administration of such a scheme. In the US, not-for-profit institutions are expected to play a greater role. In other countries, it would be more feasible for local co-operatives to be more prominent. In all cases, the transparency with which job guarantee projects are proposed,

established and administered is of vital significance. The projects should as far as possible reflect the needs and aspirations of participants, meet obvious and unmet social needs, avoid competition for real resources and markets with private businesses, and avoid substituting for conventional public service provision. Job guarantees must be based on voluntary participation, and pay and working conditions must be socially acceptable.

Proposals have been developed for job guarantees in Australia (Cook et al. 2008), the USA (Tcherneva 2014). and a number of other countries (for example, Antonopoulos et al. 2014). Lessons have been learned from the successes and limitations of major partial job guarantees. such as the *Plan Jefes de Hogar* in Argentina (Kostzer, 2008; Tcherneva & Wray 2005); the National Rural Employment Guarantee in India (Kareemulla et al. 2013); and smaller programmes elsewhere (Kaboub 2007).

At some future point, society may have attained the goal laid down in Keynes' famous essay, *Economic Possibilities for our Grandchildren,* when paid employment will no longer be seen as a social norm, and people will be free of the need to engage in paid work to maintain an adequate standard of living, to enjoy a sense of purpose and self-respect, and to maintain social status within the community. Keynes was writing in 1930 and looking ahead a century to 2030, but perhaps we will have to wait a little longer than he imagined for his vision to be attained.

If and when the society envisaged by Keynes eventually develops, perhaps there will be no more need for a job guarantee scheme, and successful societies will be able to deliver an income guarantee to their citizens, without compromising their psychological well-being or social status. Until that time, a job guarantee will be essential, for reasons of macroeconomic stability, social stability, economical sustainability and social equity.

There is no question of the affordability of such a scheme for a currency issuing central government in a modern monetary system. Indeed, as I have explained the scheme can play a major role in anchoring inflationary expectations, thereby stabilising an unstable economy; promoting social inclusion; and managing an urgent transition to ecological sustainability.

Chapter Nine

Conclusion

"The first great demand of a better social order, I should say, then, is the guarantee of the right, to every individual who is capable of it, to work … it would seem to be simply part of ordinary common sense that society should reorganize itself to make sure that individuals can make a living and be kept going, not by charity, but by having productive work to do."

(Dewey 1919, quoted in Kaboub 2007)

Only the most orthodox of economists could possibly be unaware, by now, that the intrinsic rewards of employment are in most cases far more significant for satisfaction and productivity than the extrinsic reward of additional pay. Purely financial rewards, above a minimum acceptable level, have a significant impact only in the short run, and are subject to the same habituation as many other variables. Perceived fairness is important. Psychologists have shown that financial rewards can sometimes reduce productivity, especially where tasks involve high levels of creativity, perhaps by narrowing the focus of thinking, or by crowding out intrinsic motivation.

A job guarantee can greatly reduce many of the indicators of an unequal and unsuccessful society. It can, over time, contribute towards increasing social cohesion, and insure against the consequences of social exclusion. It can actually shift attitudes. It can shift well-being.

A job guarantee can be framed in such a way as to appear attractive, and even obviously beneficial, to those who do not imagine they will ever need to participate in the scheme.

A job guarantee can always be afforded, and need never be inflationary. Far from it, of course the design of a job guarantee can allow for an effective control over inflationary pressures, and serve as a far more efficient and equitable alternative to a buffer stock of unemployed labour as a counter-inflationary device.

A job guarantee can even contribute towards the management of a steady-state economy, assuming ecological considerations bring the age of economic expansion to an end. Indeed, it is hard to imagine any other way of managing the transition to a steady state economy.

Minsky argued long ago that capitalism has a tendency towards instability and disequilibrium, and requires effective instability-thwarting mechanisms if it is to generate consistently acceptable outcomes over time and to avoid periodic crises.

It has not been possible in this thesis to explore fully all of Minsky's work, and in particular I have not addressed the full implications of his financial instability hypothesis for banking and financial system reform and supervision. An excellent discussion is provided in Wray (2016, pp 163-191).

The most important Minskian instability thwarting mechanism of all is one that has never yet been attempted in a predominantly capitalist system – a permanent, comprehensive, and flexible job guarantee.

It must be framed within a macroeconomics which takes seriously the flaws in orthodox neoclassical economics generally, and in general equilibrium reasoning in particular. This requires an understanding of the work of prominent Post-Keynesians, such as John Maynard Keynes, Paul Davidson, Hyman Minsky, and Michal Kalecki; of behavioural economists, such as Keynes (again), Herbert Simon, Daniel Kahneman, Amos Tversky, and George Loewenstein; of modern monetary theorists, such as Abba Lerner, Randall Wray, Bill Mitchell, and Scott Fulwiller; and the complementary stock-flow consistent approach to macroeconomics, pioneered by Wynne Godley and Marc Lavoie. None of the above sit within the orthodox, neoclassical church. The work of orthodox economists has provides many insights and has its uses, but the management of an equitable and ecologically sustainable future macro-economy must be based on the work of leading economists who would mostly be described as heterodox, and whose work is in most cases largely ignored by policy makers, their advisors, and academics.

Some of what is now heterodox should become orthodox. Much of what is now orthodox should be discussed as interesting logical special cases, or relegated to the history of economic thought.

The purpose of this dissertation has been to pursue this argument, and to suggest the main elements that a more useful macroeconomics of the future might incorporate. Its scope has been extensive, and the coverage therefore necessarily superficial and subjective in places. However, a strong case has been made for a reconsideration of at least some of the foundations of macroeconomic analysis and even of the appropriate objectives for and tools of macroeconomic policy. A case has been made for a new approach to economic management, and the need to undertake the task of 'stabilizing an unstable economy', informed in part by elements based on the work of leading Post Keynesian and behavioural economists.

I have advocated for a synthesis of modern Post Keynesian and behavioural approaches to economics, in order to inform macroeconomic management and the assessment of public policies, with the intention of enhancing individual subjective well-being, social inclusion and ecological sustainability.

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